





Greetings from the University of South Carolina Office of Economic Engagement (OEE). We are the single convergence point for industry, researchers, entrepreneurs, and government officials looking to engage with USC. We cultivate innovative technologies, champion entrepreneurship, and build partnerships that drive economic and workforce development in South Carolina.

Experience has taught us that operating like a business can transform the way organizations develop products, deliver services, innovate technologies, and execute strategy. By virtue of our unique structure and decades of combined experience in industry and government, OEE acts as a portal into the greater university ecosystem. We provide customized concierge service to our diverse group of stakeholders and partners, activating the vast resources of the state's flagship university for our public and private partners, both large and small.

I'd like to thank Dr. Harris Pastides for his vision to create the Office of Economic Engagement, as well as hiring a non-traditional entrepreneur and business executive to lead this initiative. I believe the work of our small team, in partnership with Dean Hossein Haj-Hariri of the College of Engineering and Computing along with the entire council of academic deans and highlighted in the subsequent pages, speaks for itself. With a relatively small budget, our team has returned USC's investment over 10-fold in less than a decade. This success is a testament to OEE's constant learning, improving, and, when appropriate, pivoting in response to events and industry trends.

While these pages are filled with examples of the value we bring to the university and our brilliant students, faculty, and staff, I am particularly proud of some of our most innovative successes, including:

- the 2022 launch of the statewide USC Flagship Network, which include the iCarolina Learning Labs at the regional Palmetto College campuses and satellite Future Factory hubs for smart manufacturing demonstrations, certifications, and credentialing;
- the 2018 opening of the Digital Transformation Lab with our industrial partners to demonstrate solutions co-developed with USC students and researchers, and;
- most importantly, inspiring change for our students and community by bringing the latest technologies into our campus environment, giving our students the real-world experience valued by companies hiring our graduates.

On behalf of our team, thank you for choosing to partner with us. Let's get to work building a world of *endless possibilities* for our students and the communities across South Carolina.

Sincerely,

William (Bill) D. Kirkland

Bill Kirkland

Our Mission To be the single convergence point for industry, researchers, entrepreneurs, and government officials looking to engage with USC. We cultivate innovative technologies, champion entrepreneurship and build partnerships that drive economic and workforce development in South Carolina. The Office of Economic **Engagement fosters** industry innovation and access to top talent, which means well-paying jobs for students and a trained, available workforce for South Carolina companies.

Our Approach... operating like a business.

Experience has taught us that thinking like a business can transform the way organizations develop products, deliver services, innovate technologies and execute strategy. We exist at the intersection of industry, research, and policy.



We are the Convergence Point

Entrepreneurs and established companies need the help of local governments and academic institutions to innovate. In turn, governments need the help of industry to meet Competitive Edge, the needs of growing populations. Growth in both requires collaboration across domains and disciplines.



Competitive Edge

OEE coordinates outreach efforts across all eight USC campuses to create a more diversified economy making South Carolina more competitive regionally, nationally, and globally.

Commitment to Innovation

OEE has created a unique consortium of public and private partners committed to helping meet the innovation challenges of the future, with particular focus on aerospace, cyber security, advanced manufacturing, healthcare and supply chain.

From Humble Beginnings...

Office of Economic Engagement is established, creating a seamless integration of corporate engagement, TCO, entrepreneurship, Innovista research district, and economic engagement.



OEE is named the first IBM Industrial IoT University partner in the US.

of the IBM-USC partnership, Horizon II is established as the permanent home of the Center for Applied Innovation, expanding the footprint of the Innovista research district.

EDA renews University Center grant providing \$578,000 for the next 5 years.

USC is recognized for being in the Top 1% of patents issued

by the National

Academy of

Inventors.

SNAI

2014

The SBA awards OEE

SBA U.S. Small Busin Administration

2015

\$125,000 FAST grant to provide leadership and assistance to startups for SBIR/STTR funding.

U.S. Small Business

2013

2011

The Ronald E. McNair Aerospace Center was made possible thanks to the generous donations from Anita Zucker, Darla Moore, and Marva Smalls.

INC Magazine names the USC Columbia Technology

> as 1 of 3 US College-Town Incubators to watch.

Incubator

USC/COLUMBIA TECHNOLOGY INCUBATOR

OEE announces founding partnership with Fluor Corporation.

FLUOR

2017

As an expansion

Boeing invests \$5M for applied Aerospace research at McNair.

2016



Siemens becomes a founding partner with OEE by investing \$628M in-kind PLM software grant.

SIEMENS

OEE is awarded a 5 year, \$520,000 University Center grant from the Economic Development Administration to kickstart the office and its initiatives.





OEE partners with SC Department of Commerce to create a statewide SBIR/STTR program, 3PhaseSC.

The Digital Transformation Lab and Internet of Things lab opens due to the collaboration between OEE and IBM, Siemens, and the newly formed partnerships with Samsung and Yaskawa.



Nephron Pharmaceuticals Corporation becomes one of the first Future Factory Lab partners to build the lab's first robotic demonstration project for pharma production with an investment of \$800,000.

In response to industry workforce needs, OEE expands its mission to include education, skilling, and workforce development.



Governor McMaster awards \$6M to OEE to create a partnership with Apple for the statewide iCarolina Learning Lab network to increase access to broadband internet and workforce development training.

EDA Build to Scale awards \$400,000 to OEE for SC Rising, a statewide program to identify, qualify, and provide equity investments to promising early-stage technology companies.

2019

\$500k to OEE for the state's first ever i6 regional innovation strategy grant to augment state and university investment in the Center

for Applied

Innovation.

EDA awards

2018

OEE's initiatives and partnerships creates over \$790M of indirect economic impact since 2013.

Siemens expands their new software and product in the Digital Transformation Lab.

2020

2021 **OEE forms**

a team with

a combined

100+ years

of industry

experience,

including

subject-matter

experts and

in-house

engineers to

help attract

and sustain

industry

partnerships.

OEE expand partnership to create the Gamecock iHub, a student-run Apple store, one of only two in the nation.

Apple and

Truist awards \$200,000 to OEE in scholarship funding for the Incubator-led South Carolina underserved and minority workforce development programs.



Capgemini

TCUBE

Incubator

company TCube

is acquired by

Capgemini,

creating over 400

Columbia-based

Jobs.

OEE and CEC establish the Future Factory Lab with industry partners to demonstrate and discover how the factories of tomorrow will operate using autonomous obotics, predictive maintenance, artificial intelligence, and live digital twin technology.

commitment to OEE by naming USC a US client demo center for demonstrations



Defense Logistics Agency and SC Department of Commerce awards \$700,000 to OEE to establish The Procurement Technical Assistance Center of South Carolina to help connect SC small businesses with government contracts. (renews annually)

OEE expands
its partnership
network to include
AWS, Rove,
Telit, Fortinet,
Checkpoint, and
Seagate.

verizon /

OEE has been invited to be one of only 5 university-based Verizon 5G Experience Hubs. (Formal Announcement in September)

So, What's Next ...

2022

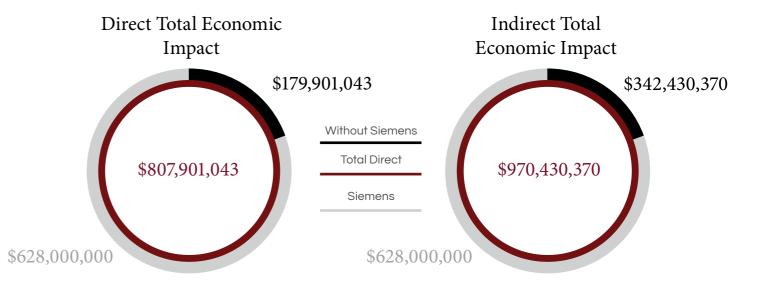
OEE held its inaugural Industry Day, a thought-leadership conference featuring USC and industry partner subject matter experts and technology demonstrations.

OEE and Lex1 school district creates dual enrollment program through Palmetto College to provide SC high school students with real-world industry use cases to create the workforce of the future.



...to an Innovative Future!

Economic Impact



Total Accrued	Direct Economic Impact	Indirect Economic Impact	
Federal Grants	\$42,373,901	\$116,528,228	
State Grants	\$30,102,142	\$30,102,142	
Industry Grants	\$12,355,000	\$24,710,000	
Industry In-Kind Investment	\$647,050,000	\$647,050,000	
Industry In-Kind Investment (without Siemens)	\$19,050,000	\$19,050,000	
Job Creation (1,086 jobs at \$70k per year)	\$76,020,000	\$152,040,000	
Total Economic Impact	\$807,901,043	\$970,430,370	
Total Economic Impact (without Siemens)	\$179,901,043	\$342,430,370	



Students

Students are always at the center of what we do.

Every day, our team is building the best student experience in the country by partnering with leaders in industry and government. These partnerships create endless opportunities for our students, preparing them for whatever comes next in their careers following graduation.

The higher education model is changing rapidly. In response, we must change our value proposition to prospective students. It is no longer enough to just educate; we also need to ensure that our graduates have the most in-demand skills and credentials to succeed in the economy of the future. At OEE, we are constantly discussing workforce needs with both elected officials and industry executives alike. This feedback loop influences our strategic direction and initiatives, allowing us to be nimble and pivot to reflect economic trends.

Prospective Student Pipeline

- Enroll in a dual enrollment program in high school to gain industry experience via capstone courses.
- Help industry
 solve problems
 through sponsored
 undergraduate
 research, building
 technology
 demonstrations, and
 interning with an
 industry sponsor.
- Gain relevant industry credentials and certifications as part of your academic work.
- Earn job offers prior to graduation by working alongside industry throughout your academic career.

OEE works with industry partners to generate use cases, technology demonstrations, and capstone projects for our undergraduate students to gain experience solving today's industry problems. The students who make up these teams often come from different academic disciplines, reflecting what they will likely experience when they enter the workforce. These projects give students exposure to the latest and greatest technological advancements and tools. Since 2017, over 90% of OEE Industry Capstone students have been hired by their Capstone Project Industry Sponsor. This success has validated our model and drives us to replicate it across campus and the entire flagship system.

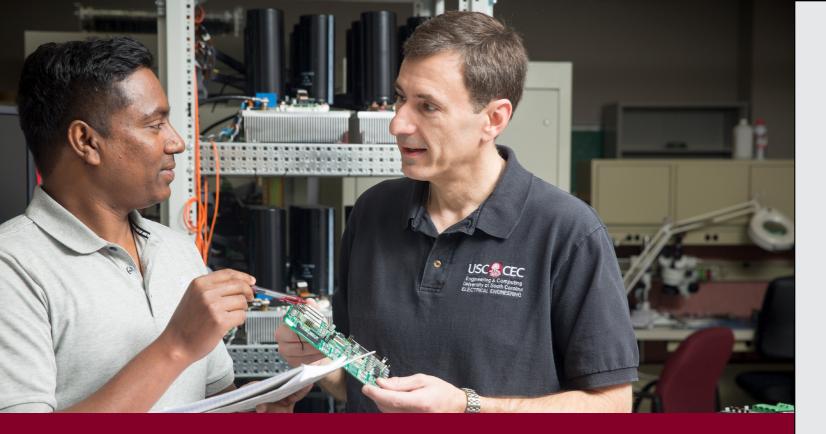
A Win-Win-Win Proposition

When Siemens presented USC with a \$628 million in-kind donation of their industrial software, OEE worked with the College of Engineering and Computing to integrate modules in the curriculum for our Mechanical and Aerospace Engineering programs. This is a win-win-win proposition: Siemens wins by having USC graduate with real-world problem solving experience using real-world engineering tools, our students win by expanding their employment opportunities to include Siemens and other industry partners, and USC wins by attracting and creating a more well-rounded and workforce ready student.

Max Kirkpatrick



A graduate of South Carolina's Governor's School, *Max Kirkpatrick* chose USC over other top-notch universities because USC provided the opportunity to work with industry partners from day one. While enrolled, Max worked side by side with various industry partners to discover and implement innovative solutions to real-world problems. Max's work would not go unnoticed as Siemens hired him before graduating in 2018. Max currently works for Siemens as a Robotic Engineer and Solutions Consultant and recently earned a Master of Science in Aerospace Engineering.



Technology Commercialization



The Technology Commercialization
Office (TCO) connects business partners
with USC researchers to create solutions
to industry needs by capitalizing on
USC's innovative intellectual property
and state-of-the-art facilities. TCO
specializes in navigating the path from
idea to the marketplace, providing
support at each step of the journey.

USC has been named to the National Academy of Inventor's Top 100 Worldwide Universities Granted U.S. Utility patents since the list's inception in 2013.

The USC OEE SBIR/STTR Difference

	1984-2013	2014-Present	Multiple Increase
University of South Carolina			
Average Annual Awards	4.2	7.8	1.9X
Average Annual Total Award Dollards	\$1.2M	\$4.2M	3.5X
State of South Carolina			
Average Annual Awards	15	29	1.9X
Average Annual Total Award Dollards	\$4M	\$15M	3.75X

Economic Impact 2014-2022

	Total Awards	Total Award Dollars	Agencies Applied To	Companies Served	Jobs Created
University of South Carolina	64	\$34M	7	26	135
State of South Carolina	237	\$121M	8	99	484

State and Federal Grant funding Sources for USC OEE SBIR/STTR Programs

- EDA University Center Grant: 2013-2016, 2017-2022
- SBA Fast Grant 2016-2022
- South Carolina Department of Commerce 3 Phase Grant: 2018-Present

Entrepreneurs

USC Columbia Technology Incubator's mission is to help innovative businesses grow through education, mentoring, and an established sense of community in an incubation facility that serves the Midlands of South Carolina.

\$21+ Million

total revenue generated by member companies in 2021

30%

increase in member companies in a year

47

current member companies (62% minority and women-owned)



members say Incubator is critical to their success

The Incubator accomplishes and manages innovative programs and educational workshops with nominal public money.

Financial \$25,000 \$25,000 \$25,000 \$75,000 Assistance: City of Columbia Lexington County Richland County Subtotal

In addition to the support noted above, the University of South Carolina provides significant administration, staffing, and management support. We also receive support in the way of grants for specific programming purposes as well as support through our business community partners.

Non- Financial Assistance:

Use of 1225 Laurel Street Building

\$184,882

(\$154,318)

Lease Revenue Generated

Operating Expenses

\$30,564 Net Benefit Received

Combined Financial & Non-Financial Public Support \$105,564

Integrated Micro-Chromatography Systems

In January 2013, USC Professors Bill Brewer, Andrew Lee, and Qian Wang founded IMCS and set up shop in the USC Columbia Technology Incubator. In addition to their seed capital, the founders attracted biotech veteran Mark Hanna, who had been involved in Aetna's \$500 million acquisition of Medicity, a healthcare IT firm. "I met Bill Brewer probably seven or eight years ago," Hanna says. "I was really interested in what Bill was doing. Bill introduced me to Andrew and Qian Wang. Due to my background, I had a clear understanding of where healthcare was going. I got on board." IMCS occupied USC Idealabs from 2014 to 2017. After graduating, IMCS moved into a 9,000-square-foot facility in Irmo, South Carolina hiring approximately 50 SC residents and serving 60 clients in every US state and 15 countries worldwide.





The Procurement Technical Assistance Center of South Carolina (PTAC SC) enables South Carolina businesses to seek contractual opportunities with the Federal, state and local government. They offer one-on-one counseling, education, and registration assistance to businesses at no cost and are funded in part through a cooperative agreement with the Department of Defense's Defense Logistics Agency, University of South Carolina, and the South Carolina Department of Commerce.



To date, PTAC SC has served 329 clients from 37 counties. Of those businesses, 135 are owned by women and 72 are self-certified disadvantaged/minority businesses. Of PTAC SC's active clients, 42% have a SBA socio-economic certification or a SCDOT Disadvantaged Business Enterprise certification.

PTAC SC has established relationships with South Carolina military bases, the U.S. Small Business Administration and other community partners to help clients best position their business to be successful in the government marketplace.

TCube Solutions → Capgemini

TCube Solutions, Inc. was a local start-up company that was founded in 2013 with the assistance of the University of South Carolina Technology Incubator program. TCube employed 100+ people and provided software systems implementation, configuration, maintenance and integration services to insurance industry clients worldwide.

TCUBE

In February 2017, Capgemini acquired Columbia-based insurance
IT services firm TCube Solutions, Inc. serving insurance clients,
and opened a new office in December 2017 in the First Base Building at Spirit Communications Park at

and opened a new office in December 2017 in the First Base Building at Spirit Communications Park The BullStreet District.



More than a tagline, our Industry Solutions team lives by those words every day. Whether you are a small business or an industry giant, we tailor solutions for every one of our partners. As the access point to the university for the private sector, OEE offers a comprehensive partnership model that covers everything from co-developing technologies and go-to-market strategies to ensuring that our graduates possess the in-demand skills needed to succeed in tomorrow's economy. These partnerships bring together university and private-sector researchers to collaborate and develop real-world demonstrations using tools such as cognitive computing, predictive analytics, and advanced visualization technologies.

Through demonstration projects housed in the McNair Center for Aerospace Innovation and Research and the Digital Transformation Lab, USC becomes the convergence point where the best minds in the industry, university researchers, and emerging university students come together to provide a fresh perspective on how to address current industry challenges. The focus is on real-world tools, real-world data, industry mentors, and leading-edge teaching and research faculty that expand the professional and social networks of our students.



- "This is exactly the kind of partnership we envisioned when Yaskawa sent our robots to USC. By placing our newest equipment in the hands of some of the world's leading innovators in manufacturing, we knew good things would happen. We couldn't be more pleased."
- Doug Burnside, Vice President of North American Sales and Marketing, Yaskawa Motoman

"What sets the University of South Carolina apart from other universities is their Office of Economic Engagement's invested interest in workforce development and industry engagement. Their constant collaboration with industry to ensure that students are being exposed to the most up-to-date technology is extremely important when producing talent, as well as attracting industry partners. The university's commitment to workforce development is evident in how they provide students with opportunities to work with real-life customers to solve real-life challenges. This model of more applied, less theory learning, allows students to gain real-world experience and skill sets that will better prepare them for the workforce of the future."



Registered Business Partner - Tom Woginrich, World Wide Business Value Advisor at IBM AI Applications

We present a menu of options for each of our partners to choose from, including but not limited to:

- sponsoring senior design Capstone classes, where a team of students works directly with the partner company to design a solution for a real-world use case.
- building out product or technology demonstrations and proofs-of-concept.
- sponsoring graduate-level research with task orders and success metrics.
- providing industrial-grade hardware, software, or mentors to work alongside our research teams.
- OEE hosting client workshops, co-developing innovative technologies, and building go-to-market strategies.





Future Factories Lab

One of the main functions of the McNair Center is to bring industrial R&D on campus to collaborate directly with students and researchers. During an *IBM* customer visit in 2018, executives from Yaskawa Motoman Robotics realized the potential and shipped two industrial robots to McNair a month later. Dr. Ramy Harik proposed the idea of the Future Factories Lab, a small-scale physical manufacturing facility, and its digital twin, complete with robotics, vision systems, conveyor belts, and data sensors that can then be tested under different disruptive scenarios.

Dr. Harik's long-term vision is to create a fully autonomous robotic manufacturing cell, complete with real-time scoring and analysis of machine performance, Artificial Intelligence (AI)-assisted decision-making, and a live digital twin powered by Siemens

Process Simulate. This research will lead to improved outcomes and greater implementation of advanced manufacturing techniques in factories operated by South Carolina manufacturers.

As the lab's funding and scope have grown, our industrial partners have increasingly supported this research. Yaskawa now has over \$1 million of industrial robots – both traditional and collaborative units – in the Future Factories Lab; *IBM* and *Siemens* have each given over \$1 million each in hardware, software, and in-kind time and effort, and the lab has attracted new partners like Verizon (industrial 5G capabilities), Dell (\$600,000 in servers), Amazon Web Services (in-kind cloud space), Seagate (\$400,000 of on-site data storage), and *Telit* (Industrial Internet of Things [IIoT] capabilities).

Nephron Pharmaceuticals Sterile Manufacturing Lab



Yaskawa provided two clean-room-certified robots (\$30,000 each) and Siemens provided the controls systems, sensors, and software to program and operate the manufacturing line. Several prototypes developed by these undergraduate teams are currently at *Nephron* undergoing fine-tuning to ensure the systems meet *FDA* standards.

Industry Partnerships

Since our founding in 2013, we have partnered with over 25 Fortune 500 companies. We create reciprocal industry partnerships that leverage USC's talent and resources of a Carnegie R1 Classification institute.



SAMSUNG FLUOR





















Government

As the state's flagship institution of higher education, the University of South Carolina is continuously working with state, local, and federal government elected officials and agencies to serve the needs of our state's residents.

OEE has an organizational structure that *aligns* strategic initiatives with federal spending priorities where we develop novel ideas and new approaches such as piloting innovative programs with local school districts to broaden access to STEM education. OEE is the laboratory of ideas for our public sector stakeholders. We are constantly incubating, testing, and validating new initiatives and programs, providing feedback to help policymakers make informed decisions when allocating limited resources.

EDA University Center

OEE leverages available Federal, State, and Local funding to maximize USC's impact throughout South Carolina.

Early-Stage Technology Development

The South Carolina Department of Commerce awarded \$600k to OEE to create and run 3Phase - a statewide SBIR/STTR development program. The EDA awarded OEE a 5-year, \$590k University Center Grant and the SBA awarded OEE for 6 consecutive years at \$125k per year (total of \$750k), which provides programs and support for statewide SBIR/STTR workshops and trainings with an emphasis on creating more minority and women SBIR/STTR applicants.

These SBIR/STTR grants provide small businesses with early-stage, non-dilutive federal funding to create and develop technology prototypes as the first step of getting their ideas out of the lab and into the marketplace.

Business Incubation/Customer Discovery

The USC Columbia Technology Incubator receives \$75k per year from the City of Columbia (\$25k), Richland County (\$25k), and Lexington County (\$25k) to fund programs to assist South Carolina early-stage companies with developing their businesses and validating their customer value propositions. The NSF awarded OEE \$500k for a USC I-Corps site where USC students and faculty participate in an immersive entrepreneurial training program that prepares scientists and engineers to accelerate the economic benefits of basic research projects that are ready for commercialization.

Small Business Assistance

The Defense Logistics Agency (DLA) awarded OEE \$570k, along with \$170k of matching funds from SC Department of Commerce, to establish PTAC SC, a statewide program that focuses on increasing government contract opportunities for small businesses.

Strategic Venture Investment

The EDA awarded OEE a \$400k Build to Scale grant to create SC Rising, which will create an investment entity for early stage and strategic investing in USC and SC based startups and initiatives.

Education/Workforce Development/Skilling

Governor McMaster awarded OEE \$6M out of the Governor's Emergency Education Relief (GEER) fund to create the iCarolina Learning Lab network, which provides South Carolinians living in broadband deserts access to high-speed broadband internet and education, as well as workforce development programs, free of charge.

Moving Forward

As the innovation hub for the university, OEE is always looking to the future. We have pioneered a comprehensive feedback loop with our academic partners on campus, in industry, and in the public sector. This continuous improvement mindset allows OEE to stay ahead of the curve and anticipate what is coming next.

By leveraging our experience and best practices, OEE has formed an established pipeline of partnership opportunities and a roadmap to successful, market-driven solution development. This foundation will help inform our future growth.

Some of these exciting initiatives include:



Expanding and growing the Digital Transformation Lab and the McNair Aerospace Center to feature new technology demonstrations and cross- disciplinary projects to solve real-world problems for industry and public sector partners.

Creating new partnerships with industry leaders like Verizon, which in September will be naming USC a 5G Experience Hub, one of five such university-based hubs in the U.S.

Building upon the successful models of the AI Institute and Nephron sterile-compounding Capstone, utilize all campus and system-wide resources to ensure USC graduates are able to meet the ever-changing demands of local industry.

Capitalizing on the USC flagship system and strategic industry cluster sites to assist local industry with solution development through the iCarolina Lab network and Future Factory satellite locations in addition to Greenville and Charleston.

Utilizing our existing and future partnership network to continue growing our health sciences portfolio in alignment with the upcoming campus at Bull Street, including the addition of a health sciences innovation hub.

Let's leverage our lessons learned to predict future success – and keep making smart look easy.

Meet Our Team



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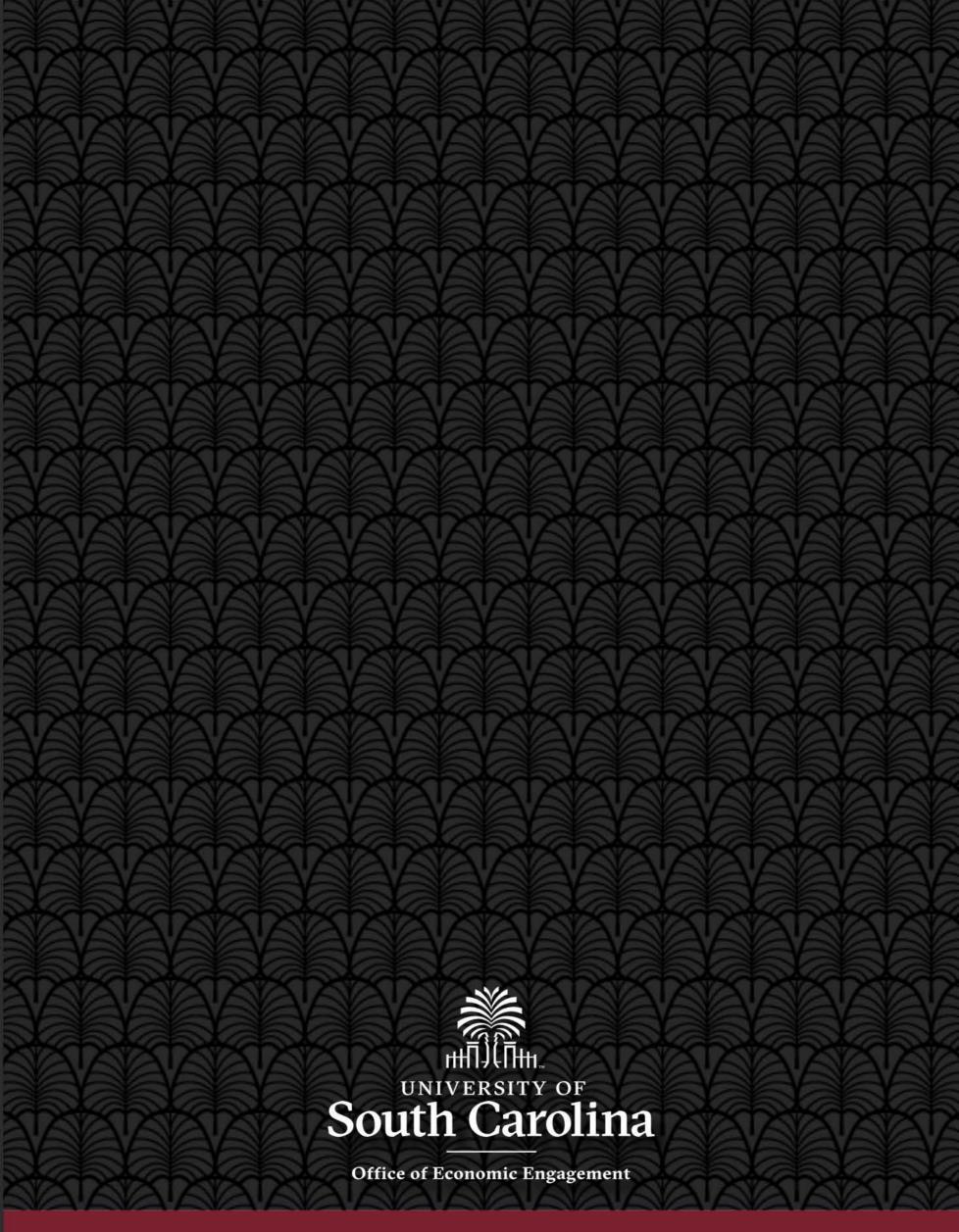
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