



VERTICAL
OPTIMIZATION
GROWING SMALL IDEAS INTO SMART BUSINESSES™

About Us....

We are a business development firm. Our company works on the application of technology to developmental problems.

Most of our work focuses on *substantively* improving the lives of people. We have experience working on a variety of scientific, engineering and manufacturing challenges in over two dozen countries around the world. A significant part of our work focuses on emerging economies and the opportunities they present.

We focus on developing and deploying systems that support *affordable* energy (especially alternative and renewables), food and agricultural processing, materials processing and recycling, industrial and specialty chemicals. We also provide advisory and productivity improvement support to our clients.

We are organized around three practice areas: (i) Access to productive capability (engineering and design capability, operational know-how, process discipline, energy, quality management, and so on.) (ii) Access to capital (which includes our capital formation services) (iii) Access to markets (which covers our market entry services).

Most of our engagements typically evolve, beginning with the first and progressing through the three practice areas indicated above. These three practice areas are represented by the three triangles that form our logo. They represent the principal issues to be addressed on the way to successful technical enterprise development. (We call our logo ‘TriVertice’ because of the three vertices formed by the ascending triangles).

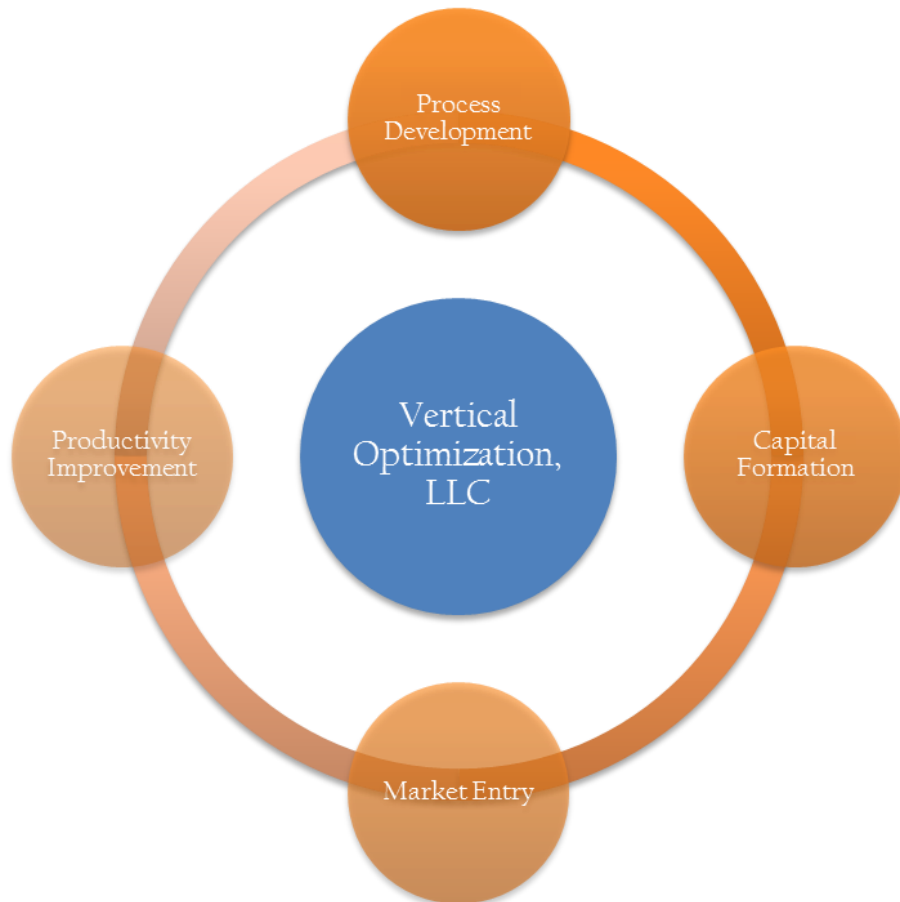
Our company was formed to address these three challenges in a seamless and integrated manner. It is our belief that these three elements must come together for the successful development of technical enterprises—anywhere. This holistic approach distinguishes our company from other firms.



Vertical Optimization, LLC
...Growing Small Ideas Into Smart Businesses^[TM]

Our tag line ‘*Growing Small Ideas Into Smart Businesses*’ reflects our commitment to assisting businesses to transform the societies in which they operate. We assist them to do this by developing and deploying their best capabilities. That is our mission as a company.

Our team of engineers, business development specialists, productivity improvement specialists, finance & marketing specialists, social enterprise & community development specialists, provides lifecycle support for enterprises, from product and process development for new projects to productivity improvement to support legacy endeavors.



For more detailed information on any of these practice areas, visit our web site (www.vo-llc.com) or refer to our practice-specific brochures. Some of our representative projects are listed overleaf.

REPRESENTATIVE PROJECTS

Our professional capabilities span the ‘enterprise lifecycle’ from the early stages of product and process development, to expansion of the enterprise & capital formation following market entry, through to the improvement of the going concern. Here is a small sampling of projects delivered by our team:

ALTERNATIVE FUELS & BIO-BASED ENERGY

- Design, development & capital formation in support of biomass gasification and carbon recovery processes for enhanced agro-processing.
- Design of integrated tire and urban waste facility for power generation and carbon recovery.
- Design, development and capital formation for flexible biomass gasification systems for rice milling (parboiling) and rice flour production.
- Design & prototyping of modular biodiesel process facility in support of oil seed production operations.
- Design & development of a prototype biomass gasification plant to generate energy from waste wood shavings in an industrial sawmill operation.
- Design and development of a modular bioethanol process utilizing waste from agro-process facilities.

MANUFACTURING & PROCESS DEVELOPMENT

- Design, development & capital formation in support of a fully automated rice mill.
- Design, development & capital formation in support of pelletized fish feed production.
- Design, development & capital formation in support of aquaculture and fish processing into packaged, shelf-stable consumer offerings.
- Design, development & capital formation in support of production of materials for sustainable housing development using natural materials (adobe blocks, bricks and bio-based reinforcement materials).
- Design, development & capital formation in support of an integrated bakery & food processing facility.
- Conceptual design of a facility for manufacture of next generation anti-retrovirals (TB/HIV).
- Design, development & capital formation in support of an integrated plastics recycling & production plant.
- Design, development & capital formation in support of a manufacturing facility for gluten-free flours.
- Design, development and capital formation for a water treatment & packaging plant.
- Design and development of a facility for production of cassava chips and palm oil derivative products.

PRODUCT DEVELOPMENT

- Market evaluation and technical analysis in support of commercialization of a patented non-toxic insect control technology using agriculturally-derived actives.
- Functional design of a home-based analytical device for urinary tract infection (UTI) testing.
- Design and development of patented next-generation dental products using natural raw materials.
- Design of a portable, scalable affordable aquaculture system for deployment in emerging markets and small-holder operations using high-durability plastic components.

MATERIALS, RECYCLING & BUILT ENVIRONMENT

- Process design & enterprise development for recycling of waste plastic streams for production of clean fuel oils.
- Development & capital formation in support of affordable housing projects using sustainable materials and recycled feedstock (including recycled plastic waste).
- Design, development & capital formation for an integrated plastics production plant (flatware).
- Design, development & capital formation for a plastics production plant (film and food packaging).

MODELING, SIMULATION & OPTIMIZATION

- Development of neural network-based artificial intelligence advisor for adaptive evaluation of synthetic routes in manufacturing system design.
- Development of an online transaction platform to facilitate cost competitiveness in high cost, low-inclusion markets (cross-border deployment).
- Enterprise modeling and simulation to support integrated decision making in complex manufacturing & distributed logistics processes.

POLICY, ADVISORY, TRADE & PRODUCTIVITY IMPROVEMENT

- Capacity building and training of various manufacturing and exporting firms in support of US market entry (US Government, multiple countries, cross-border).
- Policy analysis of trade barriers and operational constraints against effective international market entry by African manufacturers (US Government).
- Buyer linkage for micro-entrepreneurs and exporters in several emerging markets (US Government, multiple countries, cross-border).
- Market development for nutraceuticals and health products for US market entry.
- Quality management and market development supporting manufacture of consumer products (spices, coffees, condiments, and flours) for US market entry (US government, various countries).
- Analysis, design and development of community-based (and community-owned) water & power infrastructure assets in Africa.
- Supply chain design and new market development for processed food distribution (US market).
- Environmental impact reduction and energy conservation in a distributed R&D and production facility.
- Program development and management of a cooperative society to improve agricultural output amongst rural farmers for export-readiness.
- Organizational re-design and business process re-engineering (various).

About Our Founder & CEO

Dr. Emeka Nwankwo is the President of Vertical Optimization, LLC., a business development firm based in the DC area. He is a trained engineer and business development specialist. Emeka has a Doctorate Degree in chemical engineering from Columbia University in New York as well as a Master's Degree in enterprise development from the Judge Business School at the University of Cambridge, England.

Previously, he worked in the Central Research & Development Division of the DuPont Company in Wilmington, Delaware. In that position, he led a number of projects focused on business process improvement, and new venture development. These included development of new fibers for 'smart apparel' applications; instruments for rheological characterization of polymeric flows; and thin film sensors for commercial application, amongst others.



Emeka is a Certified Six Sigma Black Belt with business process improvement experience in sectors ranging from manufacturing process development & management, to energy conservation and health care & wellness delivery. He has expertise in process modeling, simulation and optimization, having worked at the cutting edge of process simulation software development. He was a pioneer in the development of enterprise modeling systems, aimed at providing integrated optimization capability for large scale manufacturing & distributed logistics operations. Those applications are in wide use today.

His work at Vertical Optimization, LLC spans several continents and sectors focusing on the development of new businesses. He leads a team of specialists who enable access to capital for businesses seeking to deploy technologies or expand existing operations, develop new market opportunities, or improve productivity.

He has led the development of ventures in a variety of sectors including design, development and operation of various agro-processing facilities, plastics manufacturing; bio-based fuels and materials; water treatment and bottling; power generation from municipal waste streams; alternative materials for affordable housing construction; actives for next-generation insect-repellents; diagnostic devices for infectious disease screening; facilities for production of bio-based fuels, amongst others. He has assisted startups and going concerns in over a dozen countries on four continents. His clients range from micro-enterprises to Fortune 500 corporations.

In addition to practical business development, he has been involved in teaching and research. He was a Senior Visiting Lecturer at the Johnson Graduate School of Management at Cornell University and the G.W.C. Whiting School of Engineering at Johns Hopkins University, teaching product design and business development. Prior to that he was an Adjunct Associate Professor of Applied Mathematics at the University of Delaware where he received several grant awards (including an NSF grant) in support of his work in the characterization and asymptotic analysis of polymeric behavior in viscometric flow fields.

Emeka has several dozen publications and major presentations to his credit, in areas ranging from wave propagation in complex fluids to management of community-based infrastructure and trade development. He serves on several boards and is a frequent speaker at many international conferences and forums.

An avid tennis player, Emeka lives in Silver Spring, MD, with his wife and three children. You may contact him directly via email (emeka@verticaloptimization.com) or by telephone (+ 1 202 370 6165).



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