
NATIONALITY **USA**

EDUCATION

Date	1966
Degree	B.S. Ch. E., Polytechnic Institute of Brooklyn, N.Y.

POLYMER CONSULTING INTERNATIONAL, INC.

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PRESENT POSITION

- President
Founded November, 2008

KEY QUALIFICATIONS

- Expertise in plastics
 - In-depth knowledge in polyolefins
 - Broad experience base M&A, commercial, strategy, benchmarking
 - Extensive experience in Latin America (Argentina, Brazil, Chile, Peru, others)
 - Market research in more than 50 countries; extensive contact base
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FIELDS OF INTEREST

- Polymers: markets, technology, feedstocks, company and global issues
- Selected chemicals and feedstocks: as above
- Environmental issues
- Polymer projects: market research, strategic planning, benchmarking and competitive analysis, feasibility studies, technology selection

Professional Experience

November, 2008 Polymer Consulting International, Inc
Formally established the company

1980 – July, 2008 Nexant/IBM/ChemSystems (retired in June, 2008) after 28 years with the company

Vice President, Polymers Business Practice (Asia and the Americas) and Director, Latin American Consulting Practice

- Detailed project list follows
- Work experience includes project management and being a staff member of the project team in a variety of areas:
 - Market research and analysis with fieldwork performed in more than fifty countries
 - Technology analysis, evaluation and selection
 - Competitive Benchmarking
 - Financial: mergers and acquisitions, refinancing, securitization of exports, project financing
 - New Project Development: feasibility studies, market analysis, competitive benchmarking, off-take agreements, social impact analysis, marketing and pre-marketing strategy, technology selection and corroboration
 - Strategic Planning: team member of the Strategic Planning Practice when polymers were involved
 - Legal: Expert witness in company lawsuits, product liability and anti-trust

1966-1980 US Industrial Chemicals (USI), division of National Distillers and Chemical Company (NDCC)

- 1966-1972 Houston Plant: Process Engineer/Technical Support for HDPE and LDPE plants; Assistant Plant Superintendent, vinyl acetate plant which included day-to-day operations optimization, technology management, project team member for HDPE and LDPE expansions and the new vinyl acetate plant based on proprietary NDCC technology from design through engineering, construction and start up
- 1973-1980: Market Research Analyst, Polymers, New York City headquarters: responsible for developing US and global industry outlook, competitive benchmarking, new business development, acquisitions and divestitures (part of team that divested international joint ventures in Belgium, Brazil and Taiwan), price forecasts, glass-to-PET conversion for liquor and wine (Almaden) divisions

Professional Organizations (prior positions)

- President, Chemical Industry Association
- Chairman, Committee on Resin Statistics, Society of the Plastics Industry
- Chairman, Chemical and Marketing Division, New York City, AICHE
- Officer and Meeting Chairman, Chemical Market Research Association

Polymer Consulting International Experience (2008-2019)

Consulting Platforms:

- **Strategy Assistance**
- **New Project Development**
- **Mergers, Acquisitions and Divestitures**
- **Litigation**
- **Bankruptcy**
- **Training**

Projects (partial list)

Strategy Assistance

- **Supply chain strategy (Petroquim, Chile):** Due to the decreasing availability of propylene from its supplier, PCI was retained to secure alternative supply sources from Asia. South Korea was identified as the most likely source. PCI arranged meetings with South Korean polypropylene producers and accompanied the client to these meetings
- **Supply chain (client confidential):** Retained by a North American distributor to secure additional polymer supply contracts
- **Company strategy (client/location confidential):** Retained by a Latin American plastics fabricator (leader in its field) to help them develop a diversification strategy
- **Supply Chain strategy (DAX Polymers, Brazil):** Retained by a Brazilian distributor of plastics to set up polymer supply contracts from North American polymer producers
- **Latin America polymer export strategy (client confidential):** Analyzed the polymer export market for a US company that wanted to increase its direct export sales in Latin America. Extensive fieldwork was performed in eight countries contacting customers, polymer producers, third party suppliers (distributors and resellers) and other participants in the industry. Key distributors were invited to the company's headquarters for meetings attended by PCI
- **Off-take Agreement (client confidential):** PCI was retained to provide technical, commercial and financial assistance to a company negotiating for a take-or-pay agreement to market a specific volume of production from a new polymer plant
- **Back Integration Strategy (client confidential):** PCI was retained by a major processor of polyethylene to help them determine if they should back integrate into the production of polyethylene. Based on the recommendations of PCI, the company decided not to pursue this strategy
- **Annual Industry Review (client confidential):** For the past six years, PCI has been retained to provide a detailed market and supplier analysis to large foreign purchaser of polyethylene and polypropylene. This information is used to develop the company's polymer purchasing strategy for the following year
- **Polystyrene Export Strategy (Unigel, Brazil):** PCI was retained to identify North American resellers/distributors that could import polystyrene from Unigel's plants in Brazil. A short list of recommended companies was developed. Interviews with these companies and Unigel were arranged and one was selected
- **Business Strategy, propylene supply (Plastiglas, Mexico):** Faced with a propylene supply shortage from domestic suppliers, PCI was retained to evaluate propylene supply options (exports) from the United States. Options were identified and meetings with prospective suppliers were arranged

New Project Development

- **Ecopetrol, Colombia:** Analysis of the polymer business (demand, suppliers, customers, business issues, logistics) in Chile, Ecuador and Peru for polyethylene, polypropylene, polystyrene, PVC and PET (PCI was subcontracted to another consulting company). This included extensive fieldwork in each country analyzing the market, suppliers, and pricing

- **Braskem-IDES, Mexico:** Responsible for the commercial analysis for this one-million ton/year ethane-based ethylene plant and downstream polyethylene plants. This was performed with another consulting company under my direction. It included a detailed market analysis by customer, grades used, products produced, prices, suppliers, unmet needs, qualification procedures and times, machinery in place and expansion plans. On the supply side, all of the relevant suppliers (polyethylene producers, distributors, trading companies and resellers) were analyzed with respect to volumes sold, customer base, logistics (warehousing and packaging), expansion plans and perceived strategy. Logistics companies were also visited to learn about their operations and ability to accommodate a new major polyethylene producer
- **Braskem-PetroPeru, Peru:** Responsible for the pre-feasibility study for the proposed one million ton per year ethane-based ethylene cracker and downstream polyethylene plants which would be located in the south. The ethane would come from the Camisea gas fields once a new pipeline was built. The project, performed in conjunction with another consulting company under my direction, included a regional market analysis, competitive cost benchmarking, price forecasts, logistics costs and delivery options analyses and a review of technology options
- **Braskem-West Virginia:** Assisted company in its analysis of the project including project economics, strategy, configuration and technology, potential customers, and timing. Project was initially postponed and finally canceled due to company issues
- **Propylene/polypropylene investment promotion (Sarnia-Lambton Economic Partnership, Canada):** PCI was retained to develop a prospectus to identify and attract a potential investor to build a propane dehydrogenation/polypropylene complex in Sarnia. The client was a government/industry organization that wanted to take advantage of the existing infrastructure to attract a company to invest in the region. PCI developed a study identifying the opportunity which was placed in the public domain and made available to interested companies
- **Ethylene/Polyethylene complex, West Virginia (Braskem):** provided commercial, strategic and technical support as part of a client/management consulting team
- **Middle East cracker/polymer complex (client/location confidential):** PCI was retained for a due diligence analysis across multiple facets of the project reviewing EPC documents, off-take agreements, project schedules, technology providers, health and safety, and other aspects of the project
- **Propane Dehydrogenation (PDH) project (client confidential):** PCI was retained to provide a technology assessment for the production of propylene from propane (PDH) for the three major licensors of the technology and a North American assessment of the propane/propylene/polypropylene market

Mergers, Acquisitions, and Divestitures

- **Acquisition of Sunoco's Polypropylene Assets (client confidential):** Retained by a North American company that was evaluating an acquisition in the polyolefins business. The project was to provide a commercial analysis of the target company, including its feedstock position, product mix, technology employed and fit with the client. The analysis was completed with the recommendation not to pursue the acquisition. This was adopted by the client
- **Divestiture:** Retained for the sale of a small, privately held consulting company where the owners want to sell the business. As a first step the current business and client base was analyzed with recommendations made to improve the company and position it for sale. Tasks included analyzing potential buyers, preparing the initial offering memorandum, secrecy agreement and detailed disclosure documents. At the time, there was no interest by third parties so the owners decided to continue operating and try at a more favorable time
- **Acquisition of Dow's Polypropylene catalyst and technology division (client confidential):** Retained by a company pursuing the acquisition of this business providing an independent review of the business, prospective licensee sales, revenues, etc. This included a detailed review of the prospectus and supporting material. Company was outbid. Sale was substantially higher than client's valuation
- **Acquisition Opportunity (Unigel, Brazil):** Unigel had a small polycarbonate plant that had been shut down due to the economic conditions in Brazil. PCI was retained to determine if there was an opportunity to sell the plant to a company in another country. Unfortunately, a buyer could not be found due to the age and small size of the plant

Bankruptcy Restructuring

- **LyondellBasell Bankruptcy Restructuring:** Subcontracted to the firm representing the DIP lenders for the Bankruptcy Restructuring of LyondellBasell. This intense analysis, spanning approximately six months, where I was responsible for analyzing LBI's global polymers business, technology and licensing platform and catalysts business. The project included site visits, access to the company's financial performance (costs,

selling prices, margins, etc.), review of relevant contract in place and current liabilities to determine the course of action for each one, review of all relevant forecasts, and participation in various meetings with the court-appointed restructuring company, LBI management, the accounting firm and the company to whom I was subcontracted. Additional work continued through the next twelve months on a less-intense basis analyzing performance reports, forecasts, etc. until the company emerged from Chapter 11.

- **Confidential:** Subcontracted to the firm representing a major plastics fabricator reviewing company confidential information

Litigation

- **Chevron Phillips vs. Ineos:** Retained by Chevron Phillips' legal counsel as an expert witness in an IP litigation
- **Confidential:** Subcontracted to the firm representing a company involved in an ethylene supply contract dispute
- **Confidential:** Provided some preliminary data and analysis for a major litigation
- **FTI:** provided support for multiple litigations for which FTI was retained
- **Product Liability (confidential):** PCI was retained in a polymer product liability litigation
- **Bankruptcy:** PCI was retained to assist in claim settlements for a company that filed for bankruptcy
- **Insurance:** PCI was retained as a polymer expert in an insurance claim as a result of Hurricane Harvey in Houston focusing on polyethylene and polypropylene. The claim was settled favorably to the client
- **Insurance:** PCI was retained by major polyolefins fabricator as a polymer expert in an insurance claim as a result of Hurricane Harvey. The engagement included timeline pricing, length of the hurricane impact (e.g., from August to the second quarter of the following year), review of claim parameters and being deposed via Zoom. The claim was settled in favor of the client.

Training

- **Polymer Course (Nexant):** Subsequent to his retirement and establishing PCI, Mr. Bauman was retained to continue to provide the training courses that he developed for Nexant for six months after his retirement until a replacement within Nexant could be trained to continue the course
- **Competitive Analysis/Strategic Planning/Industry Outlook:** One-day course given to the senior management of a Latin American petrochemical company
- **Platt's:** two-day introductory course on the petrochemical and polymer business for the Houston staff that had many new employees some with very little industry background
- **S&P Global Platts:** Course leader for one and two-day petrochemical courses, "How the Petrochemical Industry Works" which is open to all companies participating in the industry. Course venues include Dusseldorf, Germany and Rotterdam, Holland

Other Projects

- **Ethylene Cost Multiclient Study (Petrochemical Update):** PCI was retained by Petrochemical Update, a leading international consulting company based in England, to manage a multiclient study identifying all of the new ethylene crackers in North America that were based on the development of low-cost feedstock from shale gas and develop the capital costs for these investments
- **Seminar Development (ThyssenKrupp):** ThyssenKrupp, a major engineering company headquartered in Germany, retained PCI to help them develop a seminar to promote their services and technologies available for license in the United States as part of a business development strategy

Projects/Experience with Chem Systems/IBM/Nexant, 1980-2008 (partial list)

Strategic Planning

Strategic Planning (client confidential), Brazil: information used to develop the company's strategy in petrochemicals. This included a domestic, regional and global analysis of selected products, identification and analysis of key issues and industry participants and an analysis of strategic issues

Strategic Planning (various clients), North America: Participated as a team member for multiple products and companies with responsibility for polymers and their feedstocks

Strategic Planning (NOVA Chemicals): Managed the strategic planning and restructuring of NOVA's polyethylene business subsequent to their acquisition of DuPont Canada's polyethylene assets which included the SCLAIR LLDPE solution technology. Chem Systems' role was subsequently reported in their annual report

Olefins/Polymer Expansion strategy, confidential – Assisted in defining potential expansion options from the polymer opportunity side

Polyolefins Strategy Planning, South Korea – Provided assistance to client in evaluating different strategic options for its polyolefins business

Polyolefins Strategy, confidential – Evaluated various options in the polyolefins business including growth through acquisition, mergers, and grass-roots investments in the framework of the industry landscape

Polypropylene Licensing Strategy (AMOCO): Analyzed the competitive licensing market, current and potential future licensees, and, structure of the licensing program including required resources, and the overall market entry strategy

Competitive Licensor Analysis and Client Position (client confidential): This included visiting various licensees to determine their overall satisfaction with their licensors including the client company. It included licensing terms and conditions, (to the extent possible without violating confidentiality), support during start up and problems during production, on-going technology agreements (access to process and catalyst improvements) and other relevant commentary. This analysis was used to develop the client's licensing strategy

Litigation and Related Activities

Anti-trust: US Government vs. Hoechst Celanese: Engineering plastics commercial analysis (deposition) settled in favor of the client allowing the merger to proceed

Huntsman vs. TOSCO: Propylene contracts (deposition)

Product Liability: Injury from improper use of a plastic container (deposition)

Anti-trust, United States (multiple engagements including Dow/Union Carbide, Exxon/Mobil) – Assisted in addressing anti-trust issues for some of the major company consolidations with respect to the petrochemical assets

Due Diligence: Site specific asset validations for multiple projects

Market Research and Analysis

Polyolefins Planning Seminars, North America: Provided a semi-annual review presentation of the global and domestic polyolefin business including demand analysis, pricing, competitive commentary, new plant analysis, technology developments, industry structure, etc. to polyolefins producers

Polyolefins Market Analysis, China: Participated in three separate market studies for Western companies to identify and quantify polyolefins markets by province, discussed key issues such as distribution and infrastructure with recommended solutions, identified key large customers and distributors as well as major suppliers

Polyolefins Multiclient Studies: Participated in more than 15 annual studies of the global polyolefins markets performing basic market research, supply and demand forecasting, trade balances, etc. in numerous countries. Participation in most of these studies was as the Project Manager or the Project Executive

Market Analysis and Forecasts, Asia, Turkey, Latin America, North America: Developed a detailed market analysis by discrete application and then developed a forecast for the next ten to fifteen years for a variety of commodity and specialty plastics and for a number of different clients

Polyolefins Export Analysis (client confidential): Analyzed exports by type of polyolefin, supplier, grade and customer for a company building a major export-oriented petrochemical complex

Multiple Product Export Analysis (client confidential): Similar to the previous study but included other plastics and some chemicals

Technology Selection

Polyethylene technology selection, Polietilenos Uniao, Brazil: Assisted in selecting the technology for its polyethylene expansion that included a market/grade analysis, technology analysis comparison for all available technologies (cost, licensee satisfaction, grade slate, R&D position, etc.), and assistance in the selection process. Result was the selection of Chevron Phillips slurry loop HDPE technology

International investment opportunity analysis based on technology (client confidential): Assessed licensing opportunities based on the client's proprietary technologies for commodity and specialty products. This included the identification of new reviewed projects with respect to using technology to secure equity participation in the project or for off-take agreements

Technology Selection Assistance (client confidential): Provided the commercial and technical analysis to a company entering the polyolefins business. This included evaluating licensors product lines as to its fit in the domestic market, product grade slate and a domestic demand forecast

Technology Selection: Multiple projects for polyethylene and polypropylene technology for clients in Brazil, Canada, China, Philippines, South Korea, United States and Venezuela

Technology Selection Matrix: Co-developed a quantitative technology assessment methodology that provided a numerical system to evaluate the technologies and the licensors being considered for the project. This provided a transparent and defensible explanation on why the specific technology was selected in case there were questions from within the company, from external sources or from government agencies

Competitive Benchmarking

Polymer Benchmarking, Asia, Latin America and North America: Participated in numerous benchmarking assignments with a heavy focus on polyolefins. This included organizational structure analysis, cost structure, sales by market, profitability analysis, operational variables such as days of inventory, off-grade production, transition times, number of reactor and post-reactor grades, manpower, R&D, perceived strategic direction, and corporate issues where applicable

Financial (Mergers, Acquisitions, Divestitures, Due Diligence, Re-financing)

Due Diligence, Argentina: Assistance to Petrobras in its acquisition of Perez Companac, Argentina in the chemicals sector (styrene, polystyrene, SBR, polypropylene)

Restructuring/consolidation, Brazil: Provided assistance in the formation of Braskem including price forecasts, anti-trust concerns, industry outlook

Privatization of COPESUL, Brazil: Participated in the commercial advisory team responsible for the privatization of the petrochemical complex

Sale of Petroquímica Bahía Blanca, Argentina: Worked for the lead bank in the sale of the ethylene cracker, polyethylene and PVC plants

Acquisition of DuPont Canada's polyethylene assets (NOVA Chemicals): Worked with NOVA to evaluate the polyethylene business and technology of DuPont Canada's polyethylene assets

Acquisition of a polyethylene wax business (client confidential): detailed analysis of the current and future market, price forecasts and competitive dynamics

M&A, Polypropylene, South Korea: Provided assistance in evaluating merger benefits, business synergies and developing a business outlook (supply, demand, pricing, and profit margins)

Acquisition of Rexene (multiple projects for clients such as: Burlington; Sun Coast; Gilliam, Joseph and Littlejohn; and two confidential clients): This spanned a period of about ten years. There were underlying environmental issues that resulted in the acquisitions not proceeding. The projects consisted of analyzing Rexene's polypropylene, specialty waxes and fabricated products businesses with respect to markets, intermaterial competition, financials with a ten-year forecast.

Merger Synergy Analysis, client confidential: Assistance in analyzing potential synergies for a future merger of a company that included polyolefins assets. Areas of analysis included product lines, reactor production synergies, business personnel duplication, external contract consolidation savings, consolidated purchasing benefits, customer relations management, IT/MIS situation, etc.

Re-financing, North America – Three separate assignments for companies with polymer assets needing to restructure their debt due to the particularly deep downturn in 2001. All three engagements were successful in that a new financing package was negotiated

Sale of COPENE, Brazil naphtha cracker complex Commercial analysis of the product portfolio including market and price forecasts for a potential acquirer

New Project Development

Polyethylene Market and Logistics Analysis, Peru: Multiple assignments for the new petrochemical project that will be based on approximately one million tons per year of ethylene produced from ethane from Camisea at a site approximately 300 km south of Lima where the LNG export terminal was located. Work was performed for the Consortium that has the gas and LNG project. This is managed by Pluspetrol, Argentina. This included a pre-feasibility study reviewing competitive position of the proposed complex, regional market analysis and updates, price forecasts, partner Selection (company analysis, recommendations and developing the short list), review of bidding criteria and process for potential partner participation in the bidding process, review of ethane separation location options, logistics analysis for domestic and export shipments. Prior to this engagement, similar work was performed for Shell Chemicals that had the previous gas concession

Vinyls chain analysis, Peru, company confidential: regional market analysis for caustic soda, EDC, VCM and PVC, export opportunity analysis for EDC, VCM and PVC (out of region), price forecasts and a preliminary competitive position analysis

Polyethylene Project, Trinidad Westlake/NGC (National Gas Company of Trinidad and Tobago): regional polyethylene market analysis, price forecasts, and export opportunity analysis. Prior to this engagement, work was performed for previous projects led by NGC

Polypropylene Project, Trinidad, Basell/Lurgi/NEC (National Energy Corporation of Trinidad and Tobago): polypropylene project based on MTP (methane to methanol to propylene technology). Project work included a regional polypropylene market analysis and price forecasts

Petrochemical Complex, China: Feasibility study for a new ethylene cracker in China providing commercial analysis review of project, marketing plans, price forecasts, trade options, etc. Included presentations to lenders (ECA and private) on project feasibility, regional business issues and the industry outlook

Polypropylene Plant, Chile – Provided a commercial analysis for the Petroquim project including domestic and regional demand, competitive situation, operating rate and projections. Helped prepare the information memorandum and participated in the financial road show to secure financing

Petrochemical Feasibility Study, Philippines – Provided commercial analysis (domestic demand, customer identification, market development opportunities, export opportunities, etc.) as well as participating in the environmental impact assessment, public forums, government lobbying, technology and partner selection and the financial information memorandum

Project Feasibility, Brazil – Review of project economics, developed independent market analysis, reviewed marketing plan and off-take agreements, etc. for Rio Polimeros. Work continued through construction, startup and first two years of operation

Polyethylene Market Analysis, Venezuela: Provided a polyethylene market analysis for the ExxonMobil/Pequiven joint venture complex at Jose

Social Impact Analysis, Mexico (PEMEX) – Developed an impact analysis that the new NOVA/PEMEX ethylene/polyethylene Phoenix Project would have on the communities near the project and the financial benefits in tax revenues to the federal government. This included direct and residual employment, infrastructure, social benefits, etc.

Summary of New Projects and Major Expansions (partial list):

Argentina: ethylene/polyethylene project in the province of Neuquén (Provincial government of Neuquén)

Australia*: Expansion of ethylene/polyethylene)ICI Australia)

Bolivia*: Ethylene/polyethylene border project (Braskem, Petrobras Bolivia, Petrobras Brazil, YPF Bolivia)

Brazil*: Rio Polimeros polyethylene (BNP Paribas, lead lender)

Brazil: Expansion of polypropylene (Polibrasil)

Brazil*: COMPERJ new naphtha-based petrochemical project (Petrobras)

Chile*: Ethylene/polyethylene complex in Punta Arenas (ENAP)

Chile*: Ethylene/polyethylene complex in Concepción (ENAP)

China: Ethylene/polyethylene/polypropylene complex CNOOC/Shell (Banks, Shell)

China: BP/Secco polyethylene expansion (BP Secco)

China: BASF expansion (BASF)

Malaysia: Petrochemical Industry Master Plan to develop the petrochemical industry (Petronas)

Peru*: Ethylene/polyethylene/PVC complex based on gas from Camisea (Shell)

Peru*: Ethylene/polyethylene complex based on gas from Camisea (Pluspetrol)

Philippines: Polyethylene plant located in Bataan (Philippine National Oil Company, BP)

Qatar: Ethylene/polyethylene complex located in Ras Maseed (ExxonMobil)

South Korea*: Ethylene/polyethylene complex (Yukong)

Thailand: multiple projects in polyethylene, polypropylene, and PVC (PTT, others)

Trinidad: Ethylene/polyethylene complex (National Gas Company)

Trinidad*: Ethylene/polyethylene complex (Westlake)

Trinidad*: Propane to polypropylene project (National Energy Company, LyondellBasell, Lurgi)

Venezuela: Ethylene/polyethylene/ethylene glycol Project located in José (Mobil)

Venezuela*: Ethylene/polyethylene/ethylene glycol José (ExxonMobil, Pequiven)

Venezuela: naphtha-based petrochemical complex to be located in Valencia (Pequiven)

*Project Manager