

**MKTG 8604**

**New Frontiers in Retailing: Magic and Logic**

**VR/AR Technology: What Will It Take For  
Small-and-Medium Sized Companies Embrace Future of Retail**

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**Columbia Business School**

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<sup>1</sup> We would like to thank Chris Baldwin for insightful discussions.

[Title]

Hypotheses

- While the appeal and pressure for AR/VR adoption among SMEs might be heightened at this moment especially in competition with larger enterprises, investing in these technologies now will not yield maximal ROI.
- Large enterprises will continue to lead the pack as they are more likely to be early adopters, and thus able to establish trust and first mover advantage. However, it will be difficult for SMEs to exercise this competitive positioning early on.
- Overtime, SMEs will adopt the technology in an efficient and less expensive way by using third-party companies

Supporting Arguments

- The investment and expertise required to get into VR/AR is too high and most SMEs won't be able to afford it in the short term and won't prioritize this initiative. According to industry experts, Chris Baldwin and Neha Sing, SMEs should wait for costs to go down and proof of concept before investing on these technologies.
- Large enterprises with the investment capital and strategic vision will have been iterating in this space and will establish consumer education, adoption, and overall advancement of these technologies. However, overtime we anticipate it will become more affordable for SMEs to join this trend
- Overtime, SMEs will adopt the technology efficiently and less expensively by establishing third-party partnerships

Challenges

- Uncertainty exists around forecasting of benefits of VR/AR adoption in each sector
- Late adoption will impact the extent of impact SMEs can make with AR/VR technology in the overall trajectory of their financial success.
- SMEs using third-party companies to support AR/VR adoption may encounter less control, limited input, and flexibility with the technologies.

## **Executive Summary**

According to *Businesswire*, the application of VR/AR in the retail market is projected to reach US\$ 17864.86 million by 2028 from US\$ 3790.94 million in 2021 at a CAGR of 24.8% for the forecasted period. Adoption of more advanced modalities like AR/VR technologies is not homogeneous between all the different types of retailers. Currently, large companies and those that are digital native are the early adopters and are shaping consumer knowledge and preferences around AR/VR technology. Despite many notable AR/VR use cases with large enterprises, adoption among small-and-medium enterprises (SMEs) is still nascent. For SMEs, the first step to unlocking the potential growth opportunities with AR/VR adoption begins with an assessment to align business goals, weigh the benefit/cost, and identify an implementation strategy.

## **Introduction**

We are living in the Fourth Industrial Revolution or Industry 4.0, defined by how technology is transforming traditional industrial practice. Like many other industries, retail is being revolutionized by the adoption of augmented reality (AR) and virtual reality (VR) in omnichannel proposals. This is evidenced by trends such as increased sales of AR/VR headsets, with more than 26 million AR and VR headsets forecasted to be sold each year by 2023 as reported by Statista. Additionally, results of a recent survey show increased uptake in usage, with nearly a quarter (23%) of Americans having used AR/VR headsets to date. These technologies offer unique and creative solutions and options to retailers so that they can improve their customer experience. According to *Businesswire*, the application of VR/AR in the retail sector is projected to reach US\$ 17864.86 million by 2028 from US\$ 3790.94 million in 2021 at a CAGR of 24.8% for the forecasted period.

Although technology is mainstream, the adoption of more advanced modalities like AR/VR technologies is not homogeneous between all the different types of retailers. Currently, large companies and those that are digital native are the early adopters and are shaping consumer knowledge and preferences around AR/VR technology. Companies like Nike have implemented these technologies in their physical stores to increase the transparency of the product development cycle and overall supply chain. Ikea is currently using AR to offer a more personalized customer experience, offering shoppers the option to visualize the placement of an item of furniture before purchase. In other instances, large companies are leveraging these technologies for internal training purposes. For example, the use of immersive learning for customer service training at Walmart has resulted in a 30% increase in employee satisfaction, 10% to 15% higher knowledge retention, and 70% of the time employees scored higher on tests.

Despite many notable AR/VR use cases with large enterprises, adoption among small-and-medium enterprises (SMEs) is still nascent. Warby Parker is an example of an early adopter that disrupted the eyecare industry through its use of AR/VR technology from its inception, allowing customers to try on and select the perfect eyeglasses frames from the comfort of their home. Nevertheless, a substantial opportunity exists for SMEs to leverage AR/VR technology in ways that align with their business needs and goals.

For SMEs, the first step to unlocking the potential growth opportunities with AR/VR adoption begins with an internal business assessment centered around these three questions:

1. What are **the main goals** that the company wants to achieve with AR/VR given its strategic direction?
2. What are the **benefits and costs** of implementing AR/VR technology and does it make sense to implement it right now?
3. Given the strategy and the economics evaluated, how should the company implement AR/VR technology?

### **Adoption of VR/AR in small and medium sized companies (Hypotheses/Predictions)**

- 1. While the appeal and pressure for AR/VR adoption among SMEs might be heightened at this moment especially in competition with larger enterprises, investing in these technologies now will not yield maximal ROI**
  - Right now, the investment and expertise required to get into VR/AR is too high and most SMEs won't be able to afford it in the short term and won't prioritize this initiative. According to industry experts, Chris Baldwin and Neha Sing, SMEs should wait for costs to go down and proof of concept before investing in these technologies.
  - SMEs will need to evaluate whether these technologies are relevant for their customer segments and address critical points of their customers. If adoption is prioritized, then establishing and assessing metrics (e.g., sales conversations and return rates) will be necessary to justify the investment. SMEs need to remember that uncertainty exists around forecasting of benefits of VR/AR adoption in each sector. This is because it is not yet widely used and there are no established measures of success, how much it might increase conversion rate and decrease returns, etc.
- 2. Large enterprises will continue to lead the pack as they are more likely to be early adopters, and thus able to establish trust and first-mover advantage**
  - While it might be tempting for small and medium sized companies to adopt VR/AR technology at the same pace as bigger brands in their same sector, it will be difficult for them to exercise this competitive positioning at the same pace now. These organizations will have been iterating in this space and will establish consumer education, adoption, and overall advancement of these technologies. Companies like Google have already made it easy to create 360-degree VR-powered tours, and this technology will only continue to advance in the future. However, by leveraging the groundwork set forth by VR/AR early adopters with financial capital to invest, SMEs will be well positioned to still reap some benefits.
  - An important risk to keep in mind is late adoption will impact the extent of impact SMEs can make with AR/VR technology in the overall business strategy and financial success.
- 3. Overtime, SMEs will adopt the technology in an efficient and less expensive way by establishing third-party partnerships**
  - Despite the presence of some companies like HTC and MIRA dedicated to increasing the affordability of AR/VR technology, it is still very expensive for SMEs. Early adopters

and/or large enterprises with investment capital and extensive experience with AR/VR technology have started to extend their services to include B2B offerings. Examples include Farfetch with its B2B platform solutions for independent retailers and Amazon with AWS and Amazon Sumerian.

- SMEs using third-party companies to support AR/VR adoption may encounter less control, limited input, and flexibility with the technologies. These companies may not have the required infrastructure/systems to incorporate these types of technologies without proper evaluation of software and system compatibility. Additionally, having a partnership instead of in-house technology development might delay the adoption.

# Small and medium retail companies should answer 3 main questions to define whether to adopt AR/VR technologies



What are the **main goals** that the company wants to achieve with AR/VR given its strategic direction?

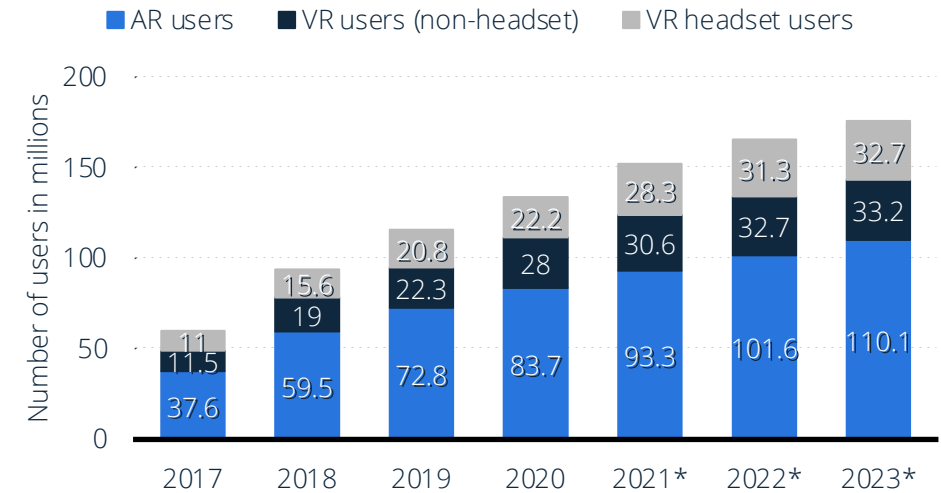


What are the **benefits and costs** of implementing AR/VR technology? Does it make sense to implement it right now?

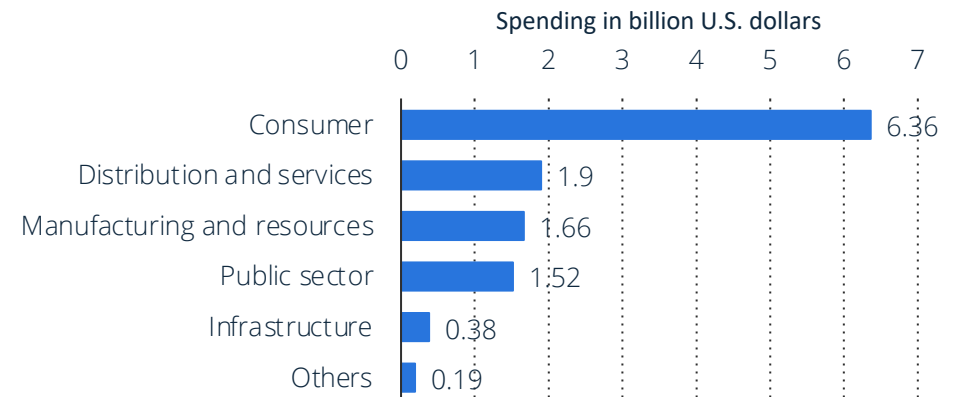


If it makes sense to adopt the technology given the strategy and the economics evaluated, how should the company **implement** AR/VR technology?

Virtual reality and augmented reality users U.S. 2017-2023



Global AR/VR forecast spending by segment 2020



**EDUCATION****COLUMBIA BUSINESS SCHOOL**

New York, NY

**MBA, Marketing and Entrepreneurship, May 2023***Honors:* Columbia Fellows, Forte Fellow*Leadership:* Healthcare Industry Association (AVP of DEI), African Business Club (AVP of Conference)*Club Member:* Columbia Women in Business, Columbia Entrepreneurs Organization, Marketing Association, Retail & Luxury Goods**RUTGERS UNIVERSITY, ERNEST MARIO SCHOOL OF PHARMACY**

New Brunswick, NJ

**PharmD (Doctor of Pharmacy), May 2011 (6-year doctorate program)***Honors:* James Dickson Carr Scholarship Recipient (2005-2009)**EXPERIENCE****FCB CURE, AN FCB HEALTH NETWORK COMPANY**

Parsippany, NJ

**Medical Director**

2016-2018

- Responsible for strategic execution of marketing communications tactics across several therapeutic areas for HCP and consumer workstreams comprising >25% of the agency's revenue. Grew clientele by 15% as strategic lead for new business development
- Collaborated with brand planners to conduct market research on skincare needs for multicultural consumers. Leveraged knowledge of medical dermatology and insights as a beauty consultant to formulate response to an RFP for a Unilever skincare brand
- Synthesized HCP and consumer market research data and leveraged insights to construct patient journey map, branded website and integrated marketing campaign for the first-in-class launch of Verquvo® and new indication expansion for Actrema®
- Developed promotional healthcare professional (HCP) assets and substantiated brand messages during regulatory review that led to the successful launch of DELSTRIGO™ and PIFELTRO™, first-in-class HIV products forecasted to reach \$500M in sales by 2023
- Spearheaded launch of network's ERG for two NJ offices and deployed new D.E.I initiatives, including a new corporate partnership with Braven Foundation to provide career and leadership training to underrepresented students at Rutgers University

**OGILVY COMMONHEALTH WORLDWIDE**

Parsippany, NJ

**Assistant Medical Director (2016-2017)**

- Researched and developed competitive analysis that informed US and global medical affairs strategy for Xeljanz® in the rheumatoid arthritis (RA) treatment landscape, with sales estimated at \$26.2B in 2019 to \$29.1B in 2029 for its RA indication
- Consulted on the medical strategy for a patient-centered initiative for Xeljanz® in partnership with the Arthritis Foundation to amplify the importance of shared-decision making in RA management care
- Developed unbranded disease awareness content on the psychosocial impact of atopic dermatitis in support of Eucrisa® launch

**Senior Medical Writer (2014–2016)**

Parsippany, NJ

- Attended and synthesized insights from medical affairs and commercial advisory board meetings, informing strategic and tactical planning across multiple brands, including Xeljanz® (RA indication), Trulance® (IBS-C indication), and Eucrisa® (eczema indication).
- Developed and maintained key medical affairs and commercial HCP assets for Xeljanz®, including a 540-slides MSL proactive/reactive deck, promotional speaker decks, speaker training resources, HCP brochures, and safety signaling communication assets for sales team)

**PHOENIX MARKETING SOLUTIONS (an independent mid-sized medical communications agency)**

Warren, NJ

**Scientific Associate**

2013-2014

- Developed and facilitated the training on nurse-focused speaker decks on the management of Erbitux®-related dermatologic side effects
- Conducted an in-depth clinical literature review of the role of embolization therapy in the management of hepatocellular carcinoma and provided strategic insights to drive multi-disciplinary medical education strategy TheraSphere™ Y-90 Glass Microspheres

**WALGREENS PHARMACY**

Elizabeth, NJ

**Staff Pharmacist**

2011–2014

- Directed daily workflow of a 6-person pharmacy team, and managed drug inventory levels to ensure efficiencies at high traffic stores with high dispensing volume of 500+ prescriptions per day
- Promoted administration of wellness services during flu season (20-35 vaccinations and immunizations daily) resulted in high customer experience ratings and overall profitability within NJ East district

**ADDITIONAL INFORMATION***Certifications:* NJ Licensed Pharmacist (October 2011-Present)*Interests:* NYC Marathon runner (2x), avid indoor cyclist, Braven career leadership coach at Rutgers University-Newark*Entrepreneurial:* Professional makeup artist and small business owner with over 10 years of experience (featured in [Washington Post](#));host of The [Subsaharan Beauty](#)—a podcast dedicated to amplifying the beauty, health, and wellness industry in emerging African markets

## NICOLE KRAWIECKI

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### EDUCATION

#### COLUMBIA BUSINESS SCHOOL

MBA, May 2022

New York, NY

2020-2022

*Member:* Management Consulting Association, General Management, Retail & Luxury Goods Club, Tech & Data Analytics Association, Latin America Business Association, Columbia Women in Business

*PANGEA:* co-led pro-bono consulting project to create a POV on market entry to EV charging stations in Kigali for a sustainable infrastructure company, focusing on research on EV players and their revenue models and analyzing potential entry options

#### INSTITUTO TECNOLÓGICO DE BUENOS AIRES

B. ENG, Industrial Engineering (5yr degree), July 2016

Buenos Aires, Argentina

2011-2016

*Honors:* Ranked top 5% out of 101 graduates

*Internship:* LATAM Airlines Finance Intern

### EXPERIENCE

#### WAYFAIR

Category Management MBA Intern (Summer 2021)

Boston, MA

- Assessed opportunity of introducing new types of format to current assortment and built-up and partly executed the GTM plan for a particular format. Focused on market research, competitive analysis, product, pricing and merchandising definition

#### BAIN & COMPANY

Consultant (2019 – 2020)

Senior Associate Consultant (2018-2019)

Associate Consultant (2016-2018)

Santiago, Chile

Santiago, Chile

Buenos Aires, Argentina

- Worked in strategy, performance improvement, lean methodologies, change management, implementation and due diligence projects in different industries including Retail, E-commerce, Mining, Automotive, along four different countries in LATAM
- Managed team of four people on various work streams of a turnaround project during one year and a half
- Active member of Bain women recruiting team: Co-led strategy for women in Chile, organized women events achieving highest number ever of attendees (+40% vs previous year) with similar increase in applicant numbers

#### KEY PROJECTS:

- Led team of four people in developing and implementing the strategy for main product categories and optimizing assortment and markdown operating model for big department store in Chile and Peru, with +10% margin growth expected in five years relative to market; Worked cross-functionally and weekly presented project updates to CEO as well as commercial and planning directors
- Constructed fact-based negotiation automated dashboard combining internal and market data, and defined strategy for two product categories for a grocery chain of leading retail company, reaching potential margin impact of +7% for certain suppliers
- Co-led negotiation of two contracts for one of the world's biggest copper mines achieving 15% in savings; Drove implementation of lean full-potential methodologies and created dashboards with main KPIs for the Electrical and Piping system construction
- Built gap analysis versus major worldwide competitor, identifying cost reduction and performance improvement opportunities of 50% increase in EBIT for a home improvement store in Chile
- Developed Argentinian cable market assessment for a due diligence; Focused on understanding current market, clients and situation by conducting and analyzing local survey and evaluated potential growth opportunities, competitive dynamics and risks
- Performed diagnostic of current dealers' model of automotive OEM in Argentina based on historic data, determined opportunities and assembled new model to boost sales and improve market share; Mediated in negotiations between OEM and 50+ dealers
- Evaluated, quantified and outlined profit improvement opportunities of the main operations of a pulp & paper company in Uruguay; Constructed simulation model for transportation operations opportunities, identifying 17% on savings.
- Designed and executed "Founder's Mentality" survey for an e-commerce company in Argentina, processed results and organized workshop with cross-functional teams to generate discussion on main pain points and opportunities
- Assessment of Credit Bureau market in Argentina for a due diligence; focused on creating diagnosis of market attractiveness including economic and political risk factors and identifying growth potential

### ADDITIONAL INFORMATION

*Technical skills:* Advanced level in MS Office, Alteryx and Tableau

*Volunteer project:* Actively participated of pro-bono change management project for an initiative of Teach for All network in Chile to build capacity for continuous improvement processes in school management teams, focused on student development

*Work Authorization:* STEM MBA, three-year OPT eligible

*Languages:* Spanish (native)

*Interests:* Hiking, road trips, playing tennis, former grass hockey player and cooking



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**EDUCATION****COLUMBIA BUSINESS SCHOOL**

MBA, Strategy and Management, May 2022

New York, NY

2020-2022

*Leadership:* Teaching assistant of Premium Brand Strategy, VP of events of Latin America Business Association and French Club*Membership:* Retail and Luxury Goods Club, Technology & Data Analytics Association, Management Consulting Association*Projects:* Post-Covid go-to-market strategy for Shiseido fragrances, Luxury Strategy Immersive Program**INSTITUTO TECNOLOGICO DE BUENOS AIRES**

BS, Industrial Engineer, Feb 2016

Buenos Aires, Argentina

2010-2016

*Study Abroad:* École Nationale Supérieure d'Arts et Métier. Paris, France, 2014**EXPERIENCE****APPLE**

MBA Intern – Reseller Operation Team (Summer 2021)

New York, NY

2021

- Built and implemented tool to automate, standardize and summarize shipment's status for America's region, having a cross-functional project management role. Used in leadership meetings: Sales leadership review, Operations Review
- Formulated escalation process to systematize shipments with high risk of impacting sales. The tool and new process eliminates communications between cross-functional teams and decreases 3rd party resellers lead time by 98%, maximizing customer service level

**PAYGOAL**

Pre-MBA Intern (Summer 2020)

Buenos Aires, Argentina

2020

- *Consulting project:* Conducted an overview of the Peruvian credit & debit card market for Peru's #2 merchant acquirer
- Provided insights regarding future market expectations and defined key initiatives to capture the main opportunities

**L'OREAL**

Product Manager – Urban Decay, Luxury makeup brand (2018-2020)

Buenos Aires, Argentina

2017-2020

- Led Urban Decay's launch in Argentina, designing the go-to-market strategy and managing all stakeholders (Merch, Digital, Client, Agencies, Commercial) which attained the #1 Makeup Brand position in brick-and-mortar stores and online channels, exceeding sales goals by 30% in the first quarter
- Designed and implemented brand's growth strategy, leveraging offline and online channels. Achieved 45% market share of makeup category in online channel of largest department store in LatAm, Falabella
- Formulated product assortment strategy, forecasting optimal mix and developing business plan to launch key products and discontinue legacy products (+400 SKUs)
- Managed 40+ influencers and 15+ makeup artists to roll-out marketing strategy. Selected by LatAm headquarters as the best practice for marketing, digital strategy, and implementation of product line launch in 2020
- Developed forecast model and implementation plan to achieve optimal inventory. Eliminated overstock of discontinued and low rotation products and reduced total inventory in +3 months
- Created a comprehensive training and incentive program for 8-person sales force team (6 Beauty Advisors and 2 Managers)

**Management Trainee Program – Luxe division (2017-2018)**

- *Commercial rotation:* Conducted sales strategy analyses for Makeup and Skincare category using customer and brand analytics. Recommendation incorporated by regional director leading to launch of Urban Decay brand in Argentina
- *Digital Marketing Rotation:* Handled the launch project of first ecommerce of L'Oréal in Argentina with Lancôme, leading implementation in SAP and supply's operation execution. Reached 2% of total direct sales in Lancôme, exceeding sales targets

**NATURA & CO**

Brazilian global brand, #1 player in the Cosmetics, Fragrances and Toiletries market in LatAm

Buenos Aires, Argentina

2015-2017

Marketing Result Analyst (2016-2017), Marketing Intern (2015-2016), Finance Intern (2015)

- Analyzed performance, competitors and pricing opportunities in the body category
- Implemented new data analytic tool to homogenize sales data, decreasing errors while reducing turnaround time by 2 days
- Designed launch strategies of fragrance category and adapted for main LatAm countries
- Constructed and implemented new pricing model. Due to constant inflation and price increases in Latin America (especially in Argentina), tool made more efficient time invested by Marketing to set prices

**ADDITIONAL INFORMATION***Entrepreneurial Venture:* Designed own fashion start up (Litchi.bsas)*Volunteer Work:* Co-leader; L'Oréal Citizen Day in Argentina assisting with school renovations*Languages:* Spanish (native), French (fluent), Portuguese (fluent)*Interests:* Fashion & Beauty: Took Fashion Business Course at Istituto Marangoni in Paris and submitted course best project about Zadig et Voltaire success in Europe, Soccer: Participate in league/tournament, Scuba diving: Certified scuba diver (open water)

**EDUCATION****COLUMBIA BUSINESS SCHOOL****MBA**, Strategy and Technology, May 2022*Leadership*: VP of Conference, Retail and Luxury Goods*Member*: Technology and Analytics Association, General Management Association, Wine Society, Columbia Women in Business

New York, NY

2020-2022

**INSTITUTO TECNOLÓGICO DE BUENOS AIRES (I.T.B.A)****BS & MA, Industrial Engineering**, April 2016 - GPA 7.43/10 (top 17%)*Study Abroad*: Universidad Politécnica de Catalunya, Barcelona, Spain (Fall 2013); Santander scholarship for exchange programs

Buenos Aires, Argentina

2010-2016

**EXPERIENCE****MICROSOFT****MBA Summer Intern – Global Partner Sales Strategy Team**

- Identified influential areas of investment to accelerate the customer buying process for SaaS applications by understanding the customer behaviors throughout the decision-making journey specific to certain customer segments.
- Presented recommendation around strategy and improvements to evolve a specific partner program, spanning scenarios definition, process improvements, and implementation of tool that consolidated resources available.

New York, NY

Summer 2021

**MATRIX CONSULTING***Management Consulting firm with 90+ employees focused on LATAM Market***Senior Consultant** (2018-2020)

- Redesigned maintenance model in largest producer of wines in Latin America, focusing on operational excellence and resulting in 10% annual cost reduction
- Guided cross-functional client team of 13+ managers in customer experience transformation using design sprint methodology and designed new governance to ensure implementation of initiatives in largest bank in Chile
- Orchestrated opportunity assessment in sales logistics for leading Chilean agro-industry company; reduced costs by \$34M
- Coordinated team of two technical consulting companies in holistic diagnosis of top Chilean iron ore producer with focus on strategy, sales, operations and organization, identifying opportunities representing \$100M
- Spearheaded Women in Matrix (WIM), created to encourage women's empowerment among employees (30+ consultants/staff)
- Received fast-track promotion in one year for strong performance (normally two years)

Santiago, Chile

2017-2020

**Consultant** (2017-2018)

- Analyzed and re-designed HR processes in multinational bank; trained client's team in continuous improvement methodology
- Developed growth strategy and business unit's configuration for Chilean family holding with +\$1B in assets, identifying opportunity for company to increase EBITDA from \$12M to \$100M in 5 years

**SC JOHNSON****Senior Material Planner – Shared service center LATAM**

- Secured materials for production in every Latin American plant, and managed imported products from top suppliers
- Led two projects and participated in initiatives to improve efficiency and effectiveness using Lean skills
- Kept healthy inventory in warehouses and ensured quick response to sudden change in demand stemming from health crisis

Buenos Aires, Argentina

2016-2017

**PROCTER & GAMBLE****New Initiatives Planner** (2015-2016)

- Managed seven projects on new products and changes in formulas or packaging; coordinated cross-functional team of 10+ daily
- Drove \$400M in cost savings by managing inventory efficiently and avoiding scrap generation in phase in-phase out of SKUs

Buenos Aires, Argentina

2014-2016

**Material Planner** (2014-2015)

- Generated purchase orders of 300+ materials, equivalent to 80% of materials needed for production in Exal Packaging plant
- Accomplished "0 cuts" in production and healthy inventory, allowing good service
- Built long-term relationships with suppliers to increase supply chain efficiency, signed contracts with 100% of suppliers, ensured that suppliers maintained exclusive safety stock with no extra cost, and achieved results beyond target

**ADDITIONAL INFORMATION***Interests*: Architecture enthusiast (helped two popular architectural exhibitions "Casa FOA" and "Estilo Pilar" in Buenos Aires)*Languages*: Fluent in Spanish, Basic in German and French*Work Authorization*: STEM MBA, three-year OPT eligible