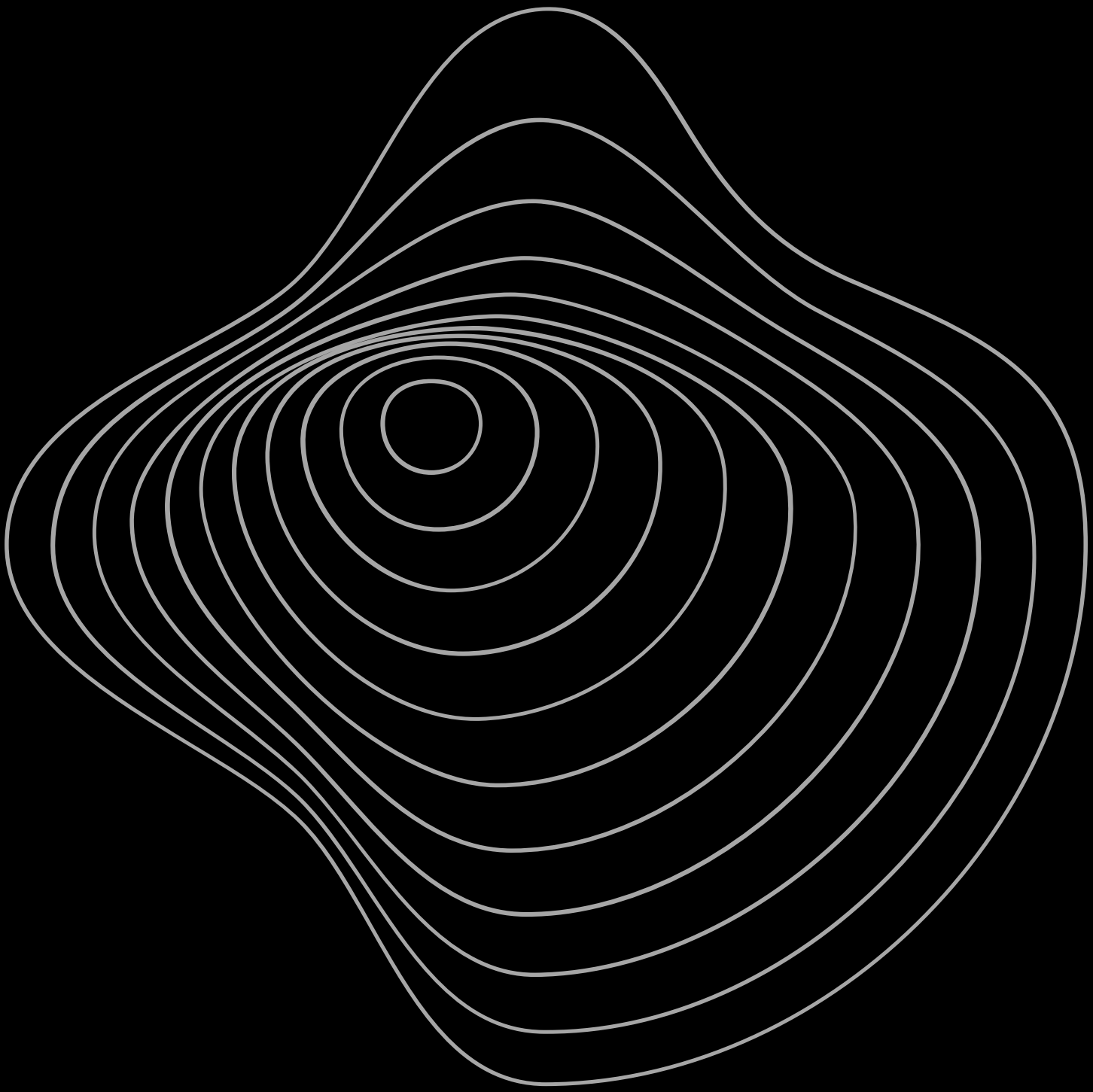

The Haskayne Report

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Foreword

Following our graduation from the Haskayne School of Business, we wanted to pass this project along to a new group of students, with the hope that they would take it further than we had before.

So far, we are pleased. A new group of curious and involved students have adopted the responsibilities that we could no longer take on. In addition to adopting these responsibilities, our editorial board took a shot at publishing their own articles. This edition is the culmination of the direct and indirect efforts of our staff.

As you read, you will find much discussion of innovative progress and sustainable solutions. These are the types of ideas that HSKR seeks to put on display. While there are many logistical barriers to creating entirely profitable markets at no expense to sustainable practice, we hope the discussions in this edition will spark contemplation by uncovering possible avenues for change in particular industries.

Be well,

Monica Uppal and Sahil Gaur
Founders of The Haskayne Report

A Message

From Our Editor

To the reader,

On behalf of the Haskayne Report, I would like to thank every individual that made this edition a success, especially our HSKR writers and advisors. Once again, we received a great quantity and quality of submissions.

I have been fortunate to continue my efforts with The Haskayne Report this academic year but this time as the Editor-in-Chief. Even amidst the pandemic, it has been an incredible experience collaborating with a new set of team members. I would like to acknowledge the efforts of the entire HSKR Executive Team (2021-2022) - from the Editorial Board Members to the VP Design to the VP Operations and Finance. Thank you for your work!

HSKR will continue to provide a platform that amplifies the voices of University of Calgary students.

Thank you for your time and support. I hope you can set out some time to read this edition - it will definitely be worthwhile. As always, do not be shy to reach out with any comments or feedback you may have.

Best,

Karen Uppal

In This Edition

The student-curated articles included within this edition address relevant and pressing business topics. The initial featured article will discuss the emerging popularity of hydrogen and related innovative technologies as well as provide recommendations for the adoption of hydrogen, given its promising effect on the local and national economy. This article will be followed by a discussion about the need for sustainability within the apparel industry and examine the best practices of industry leaders. The next article will critically analyze the current operating model of the Olympic Games in the global society and provide recommendations for the International Olympic Committee. Novel and innovative business models evolving within the motorsport industry will then be discussed. Next, the existing representations of minorities within the corporate world and an argument for tangible inclusive business practices will be highlighted. The sixth article will highlight the importance of experiential learning and its relevance to fostering a robust corporate culture. The final article will explore the environmental impact of trucking and the future of transport.

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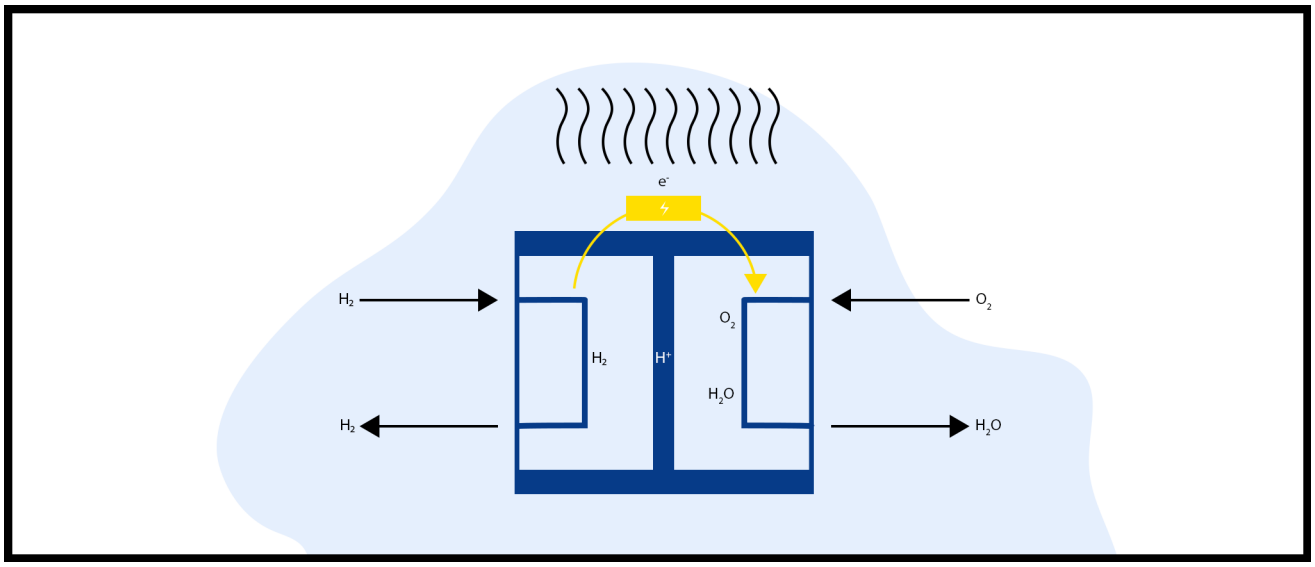


The Proliferation of the Hydrogen Economy

By Cameron Armstrong

State of the Hydrogen Economy

Hydrogen is a potential clean energy solution that has been garnering more attention as the world looks for diversified energy sources. Hydrogen shows incredible potential when addressing energy transitions as it is readily available, energy dense, and fast to refuel. Also, it has zero noise, visual, or greenhouse gas pollution resulting from its use.

The global hydrogen economy is expanding amid surging environmental concerns, increasing government initiatives for developing cleantech infrastructure, and technological advancements heightening hydrogen's future potential. Around the world, governments are increasing monetary commitments to hydrogen infrastructure. In 2020, Germany adopted a national hydrogen strategy committing $7.9BN USD to new hydrogen businesses and research, Australia committed $207MM USD to finance projects growing its hydrogen economy, and the US increased its annual spend on hydrogen research, development, and deployment to $150MM USD (Dolan, 2020). In Alberta, the provincial government released a Hydrogen Roadmap in November of 2021, outlining goals for the near, medium, and long term. In the near term (2021-23), the action plan lists goals of blending hydrogen into natural gas distribution systems, increasing access to capital to support hydrogen infrastructure developments, and developing clean hydrogen hubs and partnerships across the province. The roadmap sets ambitious goals for 2030, citing $30BN CAD in new capital investment planned for clean hydrogen production and development in the province. By 2030, benchmarks for success include hydrogen integrated energy systems, global clean hydrogen exports, tens of thousands of jobs and billions of dollars of economic activity being created, and 14 metric tons of annual greenhouse gas emission reductions (Government of Alberta, 2021). As provinces across Canada and nations around the world diversify their energy infrastructures, developers of hydrogen fuel cells and fuel cell

vehicles will see continuing expansion.

Standard and Innovative Technologies

Hydrogen fuel cells are like the engine of the hydrogen economy and membrane electrode assemblies are the engine blocks of these machines. These membranes act as catalysts for generating electricity within a fuel cell. Currently, only carbon powders are commercially available for this purpose and they require arduous preparation steps and produce variable results (Atwa, 2021, p.1). Powder membranes are now threatened by a carbon film replacement. A carbon film filling this need was developed at the University of Calgary by the Birss Group. The technology has been patented and is being commercialized by an Alberta startup, Momentum Materials Solutions, founded by two of the developers, Chengying Ai and Viola Birss (Ai, 2021). When looking ahead, experts projected in July 2021 that "membranes are expected to continue to play a dominant role for the next 5–10 years, and continuous improvements are expected to contribute 10–20% to the improvement of power density... Improving power densities, reducing costs, and increasing the durability of fuel cells will directly promote large-scale commercialization" (Jiao, 2021, pp. 365/367). While hydrogen vehicles are in the early stages of adoption, there is clear potential for applying this technology toward cleaner transportation. The Royal Society of Chemistry published research outlining the paradigm-shifting nature of carbon film membranes, stating that carbon film, compared to powders, demonstrated higher levels of conductivity, durability, and uniformity. This uniformity enabled more predictable and repeatable test results and demonstrated the potential for exceptional scalability (Atwa 2021). Carbon film membranes will increase the performance, reduce the cost, and progress the adoption of hydrogen vehicles as the world continues pursuing cleantech.

Conclusion and Recommendations

In 2021, we are at a tipping point in hydrogen adoption. Innovations such as carbon film membranes are increasing the performance and durability of hydrogen fuel cells and, in turn, hydrogen vehicles. Renewable energies are becoming increasingly prevalent and affordable, bringing down the environmental cost of hydrogen production. Governments around the globe are investing in hydrogen fueling infrastructure, funding R&D, and incentivizing business development. All these converging factors validate the valuable future of hydrogen in the growing cleantech economy.

For the hydrogen economy to continue progressing, there are multiple measures that should be pursued. First, governments should continue supporting the hydrogen economy through tax incentives for early adopters of hydrogen vehicles, grant funding for innovative technology startups, and subsidies for the expansion of fueling infrastructure. Second, corporations should continue funding cleantech innovation, driving down the cost of renewable energy sources as they proliferate. Third, international cooperation will be critical in the hydrogen economy's success. Bilateral and multilateral agreements and initiatives will help supply meet demand so that markets with high concentrations of hydrogen vehicles are able to meet their demand through partnerships with hydrogen suppliers around the world. Along with international cooperation comes international regulation; regulatory frameworks will need to be developed to accurately define the carbon footprint of hydrogen production and consumption.

Canada is doing an excellent job of progressing the

hydrogen transition, with Alberta acting as a leader. Continued government investment for startups and SMEs pursuing hydrogen technologies will enable the faster progression of these technologies' commercial readiness. Once the economic viability of hydrogen as an energy source is established, government support will be less critical as these innovative startups grow into major corporations that are able to export hydrogen and fuel cell components around the world, bringing exponential GDP growth and economic benefit to Canada.

As of September 2021, 13 countries and the European Union have published national hydrogen strategies with 10 being published in the last year, including Canada. There are reportedly 19 other countries drafting strategies with the aim of publishing them in 2021 (World Energy Council, 2021). While increasing numbers of countries publishing hydrogen strategies is a sign of progression, a lack of action from energy superpowers mitigates this potential. The world is still waiting on official hydrogen strategies to be published by China, Russia, Venezuela, and Saudi Arabia. Should these countries commit to the transition, the world will see a new energy ecosystem emerge and the hydrogen economy will swell?

REFERENCES

Ai, C. (n.d.). *Advanced materials for a better future*. Momentum Materials Solutions. Retrieved October 12, 2021, from https://momentummaterials.ca/.

Atwa, M., Li, X., Wang, Z., Dull, S., Xu, S., Tong, X., Tang, R., Nishihara, H., Prinz, F., & Birss, V. (2021). Scalable nanoporous carbon films allow line-of-sight 3D atomic layer deposition of pt: Towards a new generation catalyst layer for PEM fuel cells. *Materials Horizons*, *8*(9), 2451–2462. https://doi.org/10.1039/d1mh00268f

Dolan, C. (2020, July 27). *International government hydrogen developments*. Fuel Cell & Hydrogen Energy Association. Retrieved October 12, 2021, from https://www.fchea.org/in-transition/2020/7/27/international-government-hydrogen-developments

Government of Alberta. (2021, November 5). *Alberta hydrogen roadmap - Executive summary.* Open Alberta. Retrieved December 2, 2021, from https://open.alberta.ca/dataset/893c5a14-af92-4a19-b1e5-d9395a00a2dd/resource/95c555e7-1b05-4ad9-af31-0a4f569ce99c/download/energy-alberta-hydrogen-roadmap-executive-summary-2021.pdf

Government of Alberta. (2021). Hydrogen roadmap. Retrieved December 12, 2021, from https://www.alberta.ca/hydrogen-roadmap.aspx

Jiao, K., Xuan, J., Du, Q., Bao, Z., Xie, B., Wang, B., Zhao, Y., Fan, L., Wang, H., Hou, Z., Huo, S., Brandon, N. P., Yin, Y., & Guiver, M. D. (2021). Designing the next generation of proton-exchange membrane fuel cells. *Nature*, *595*(7867), 361–369. https://doi.org/10.1038/s41586-021-03482-7

World Energy Council. (2021, September). *Hydrogen on the horizon: Ready, almost set, go?.* Retrieved November 11, 2021, from https://www.worldenergy.org/assets/downloads/Working_Paper_-_National_Hydrogen_Strategies_-_September_2021.pdf

Addressing Clothing Pollution: The Need for Sustainable Practices in the Apparel Industry

By Marcus Smith

Trends in the Apparel Industry

The importance of sustainability and environmental protection is an issue that has not been understated and has gained considerable attention in the media, due to the looming climate crisis. Of all the industries being pushed to develop more sustainable standards, the apparel and textile industry may not be the first one that comes to mind, with energy and automotive sectors constantly being criticized for emissions. While that criticism may be valid, the fashion industry surprisingly ranks as the second-largest polluter in the world (Charpail, 2017). The numbers reveal that consumers keep items for half as long as they used to 15 years ago, and the number of garments purchased by consumers each year is up 60% since the year 2000 (Remy, Speelman, & Swartz, 2016). These metrics are alarming as the apparel industry is expected to produce over 3 billion tons of CO2 emissions and use 170 billion cubic meters of water per year by 2025 (Remy, Speelman, & Swartz, 2016). This is compounded by the fact that clothing prices have risen at a lower rate compared to other consumer goods, allowing consumers to buy more for less (Remy, Speelman, & Swartz, 2016).

Why Sustainability in Apparel Matters?

Sustainability is crucial in the apparel industry due to the previously mentioned impact of its operations and the future growth expected for the industry. The industry is currently valued at over $3 trillion USD and is expected to grow at a rate of 5% per year by 2025 (Remy et al., 2014; Shirvanimoghaddam et al., 2020). While this economic growth is promising, the waste that comes along with this growth is alarming. For example,

over $400 billion worth of apparel is thrown away as waste each year, and two-thirds of these abandoned materials will take decades to decompose (Shirvanimoghaddam et al., 2020). The impact these practices have on climate change is pronounced, and the filling of landfills with waste from the garment industry is likewise severe. In 2018, the fashion industry contributed to 4% of the world's total greenhouse gas emissions (Berg et al., 2020). Improving a company's supply chain practices may be the best way to improve the company's overall environmental impact. On average, the supply chain of an apparel company produces over 80% of the total carbon emissions of the company's activities (Bove & Swartz, 2016). If these unsustainable patterns do not improve, the impacts of global warming and climate change may reach a point of no return.

Best Practices of Industry Leaders

When looking at current supply chain sustainability innovations in the apparel industry, we can look at firms such as Patagonia and Nike. Patagonia has started to drive sustainability from the ground up, quite literally. It is working with over 100 farmers to engage in regenerative agriculture for its raw materials, which can result in a carbon-negative farming process (Morin, 2020). Patagonia has also invested in over 70 repair centres worldwide, repairing over 100,000 products per year for consumers (Batten, 2020). These practices allow the company to prolong the life of its garments and keep them out of landfills. Additionally, the firm has committed to move towards 100% renewable and recyclable raw materials for all its products, and is well on track with 64% of this year's clothing made with recycled inputs (Patagonia Inc., 2021). Patagonia is also an innovator in the apparel industry regarding supply chain transparency, giving full disclosure on its supply chain practices to the public (Bateman & Bonanni, 2019). Nike has made impressive strides in supply chain sustainability as well. The apparel giant has leveraged proprietary in-house recycling systems to reuse over 47 million kilograms of manufacturing scrap into new footwear and apparel products (Nike Inc., 2021). Nike has also leveraged its reverse supply chain through its reuse-a-shoe program, which has allowed Nike to recycle over 33 million pairs of used athletic shoes into new products through consumer donations (Cline, 2020). Nike's reuse of old products and manufacturing scraps allows the firm to function more sustainably while reducing reliance on raw materials from suppliers. With growing global climate concerns, adopting a more sustainable supply chain allows corporations to help the environment and its bottom line.

Future of Apparel Sustainability

The next steps in apparel sustainability largely stem from improving supply chain practices. The adoption of the circular economy model is highly enticing in terms of driving sustainability as it drastically reduces waste. At its core, a sustainable economy model involves reusing waste from the consumer or manufacturing process and then turning it into value for the consumer (Rubel, Schmidt, & Zum Felde, 2018). Another trend that is becoming apparent is the focus on supply chain transparency. From the increasing pressure by governments, consumers, and other stakeholders, companies are under pressure to show the inner workings of their supply chains and operations to those who want to see (Bateman & Bonanni, 2019). A by-product of increased supply chain transparency is the improved management and more stringent selection processes for how companies choose their suppliers. Companies are developing key performance indicators for their suppliers to track performance, allowing them to work with suppliers to improve their environmental footprint or adopt more sustainable sources (Bove & Swartz, 2016).

Conclusion

Ultimately the future of sustainability lies with the customer. How the consumer votes with their wallet and whether they advocate for environmentally friendly products will determine the future of sustainability in the apparel industry. Younger generations such as Millennials and Gen Z will pay more for sustainable products and prefer to buy from sustainable brands (Petro, 2020). Additionally, 67% of consumers consider sustainable materials to be an important buying factor for apparel (Granskog et al., 2020). These trends signal a larger shift to come, where demand may be increased for sustainable garments and fast fashion brands will be forced to adapt or fall by the wayside. Apparel companies should follow the leads of Patagonia and Nike and invest in a more transparent supply chain and the practice of reusing old material to create new products. With the issue of climate change at the forefront of the media, corporations are facing pressure now more than ever to shift to more environmentally friendly practices. Unless the fashion industry becomes more sustainable, it risks pursuing profit at the expense of irreversibly harming the environment.

REFERENCES

Bateman, A., & Bonanni, L. (2019). *What supply chain transparency really means.* Harvard Business Review. Retrieved from https://hbr.org/2019/08/what-supply-chain-transparency-really-means

Batten, C. (2020). *Patagonia's worn wear collection is saving the planet.* The Manual. Retrieved from https://www.themanual.com/outdoors/oatagonia-worn-wear-collection-recycled-recommerce/

Berg, A., Magnus, K. H., Kappelmark, S., Granskog, A., Lee, L., Sawers, C., & Polgampola, P. (2020). *Fashion on climate: How the fashion industry can urgently act to reduce its green house gas emission.* McKinsey & Company. Retrieved from https://www.mckinsey.com/~/media/McKinsey/Industries/Retail/Our%20Insights/Fashion%20on%20climate/Fashion-on-climate-Full-report.pdf

Bove, A. T., & Swartz, S. (2016). *Starting at the source: Sustainability in supply chains.* McKinsey & Company. Retrieved from https://search-proquest-com.ezproxy.lib.ucalgary.ca/docview/2372072491?pq-origsite=primo&accountid=9838

Charpail, M. (2017). *Fashion's environmental impact.* SustainYourStyle. Retrieved from https://www.sustainyourstyle.org/old-environmental-impacts

Cline, E. (2020). *Ask a sustainability expert: how do I recycle my worn-out shoes?.* Fashionista. Retrieved from https://fashionista.com/2020/02/how-to-recycle-shoes-sneakers-heels

FY20 Nike, Inc. impact report. (2021). Nike Inc. Retrieved from https://purpose.nike.com/fy20-nike-impact-report

Granskog, A., Lee, L., Magnus, K. H., & Sawers, C. (2020). *Survey: consumer sentiment on sustainability in fashion.* McKinsey & Company. Retrieved from https://www.mckinsey.com/industries/retail/our-insights/survey-consumer-sentiment-on-sustainability-in-fashion

Morin, C. (2020). *Patagonia's customer base and the rise of an environmental ethos.* CRM.org. Retrieved from https://crm.org/articles/patagonias-customer-base-and-the-rise-of-an-environmental-ethos

Petro, G. (2020). *Sustainable retail: How gen z is leading the pack.* Forbes. Retrieved from https://www.forbes.com/sites/gregpetro/2020/01/31/sustainable-retail-how-gen-z-is-leading-the-pack/?sh=2253544d2ca3

Remy, N., Schmidt, J., Werner, C., & Lu, M. (2014). *Unleashing fashion growth city by city.* McKinsey & Company. Retrieved from https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/marketing and_sales/pdfs/unleashing_fashion_growth.ashx

Rubel, H., Schmidt, M., & zum Felde, A. M. (2018). *Ten steps toward the circular economy.* Boston Consulting Group. Retrieved from https://www.bcg.com/publications/2018/ten-steps-toward-circular-economy

Shirvanimoghaddam, K., Motamed, B., Ramakrishna, S., & Naebe, M. (2020). *Death by waste: Fashion and textile circular economy case.* Science of the Total Environment, *718*, 137317. https://doi.org/10.1016/j.scitotenv.2020.137317

Why recycled?. (2021). Patagonia Inc. Retrieved April 5th 2021 from https://www.patagonia.com/why-recycled/

Faster, Higher, Stronger - Cheaper: A Financially Responsible Future for the Olympic Games

By Michael Girum

In February 2022, the Olympic torch will be lit and the 24th Olympic Winter Games will officially commence in Beijing, China. The Olympic Games are month-long festivals of sport, where the world's most talented athletes compete for both their national pride and for the title of Olympic champion. The modern Olympics, founded at the end of the 19th century, is more than a celebration of human athletic achievement; its fundamental aim is to use sport to promote peace and understanding between people, and to set an example for peaceful global interaction (Bach, 2016). As the world continues to grapple with the COVID-19 pandemic and an increasingly tense political and social environment, the Olympic movement and its mission are of paramount importance to the international community. Traditionally, the Olympic Games have been extraordinarily successful at captivating the world and drawing mass viewership.

The 2012 London Summer Olympic Games reached 4.1 billion viewers internationally and viewership numbers have been increasing in each Olympic cycle (IOC, 2012). Despite the nobility of the Olympic movement, and the international attention that the Games garner, cities around the world are becoming less willing to host the Olympic Games. Historically, hosting the Olympic Games has been a special privilege awarded after a long and competitive bidding process between as many as ten cities. Recently, however, the last three Summer Olympic host selections have been contested by only one city and have all received unanimous approval from the members of the International Olympic Committee (Ramaswamy, 2015). Cities around the world have also seen potential bids vetoed by citizens in referendums and plebiscites. Calgary, Sion, Davos, and Hamburg are just some of the major cities whose citizens voted against even exploring a bid for the

Olympics. There is an obvious need for the Olympic Games in society, however, its current operating model is placing its future in jeopardy and is driving cities around the world away from hosting the Olympic Games.

When cities commit to hosting the Olympic Games, there are substantial short-term costs associated with running the month-long event. These costs include the costs of venues, events, and security. Some cities can use their existing sporting infrastructures when preparing for the Olympics, however, many cities do not have all the venues available for all sports at an Olympic standard, thus much construction is required. London, one of the most established sporting cities in the world, had to build the brand-new Queen Elizabeth II Olympic Park in preparation for the 2012 games. This sporting complex included the new London Olympic Stadium, which was used for opening ceremonies and track and field events, the London Aquatics Centre, which was used for swimming and diving events, the Lee Valley VeloPark, which was used for cycling, and numerous other world-class athletic facilities. The costs associated with infrastructure and security alone totalled approximately $ 8bn USD. This is in stark contrast to the ticketing revenue that was generated from London 2012, which was only $3.1bn USD (London 2012 Olympic Games Budget Report, 2013). This is compounded by the fact that many host cities do not have use for the facilities after the Olympics are over. This is best demonstrated by the state of disrepair during Rio de Janeiro's 2016 Olympics. In 2020, just four years after the games, a Brazilian judge ordered the closure of the Rio de Janeiro Olympic Park, citing safety and maintenance concerns (Rio Olympic Park: Judge orders closure of site over safety concerns, 2020). Cities cannot be reasonably expected to make billion-dollar investments in projects that do not cover their start-up costs and have no long-term value.

Conversely, the Olympics often serve as a catalyst for much-needed city regeneration and development. The Olympics have traditionally created circumstances that allow cities to invest in themselves and modernize public transportation. However, these long-term benefits rarely justify the short-term expenses and losses that cities incur as a result of preparing for the Olympic Games. The Olympics must be restructured in a way that maintains the spirit and integrity of the occasion but ensures that it is financially feasible for cities. Soccer's FIFA World Cup and UEFA European Championships are tournaments that face similar obstacles to the Olympics, as they require similar levels of infrastructure investment. These tournaments have begun improving long-term financial feasibility for their hosts by dividing hosting duties amongst bordering nations. The 2026 FIFA World Cup will be hosted by all three of Canada, the United States, and Mexico, and the 2020 European Championships will be divided between 11 European nations. The Olympic Games could adopt a similar approach and divide certain events between different cities or even nations. Another potential strategy to ensure the long-term financial stability of host cities is to enter long-term hosting contracts with certain cities. Rather than only awarding one Olympics to a city, a city could use their facilities to host two or three Olympic cycles. This would allow cities to gain more tourism and ticketing revenue and make hosting a much more attractive proposition.

The Olympic Games have a significant role in our global society and its importance to athletics and the world cannot be overstated, however, to ensure its long-term financial feasibility, the International Olympic Committee must reform the Games to ensure that hosting the Olympics remains an attractive proposition for cities around the world.

REFERENCES

Bach, T. (n.d.). *The Olympic Movement, the United Nations and the pursuit of common ideals*. United Nations. Retrieved December 10, 2021, from https://www.un.org/en/chronicle/article/olympic-movement-united-nations-and-pursuit common-ideals

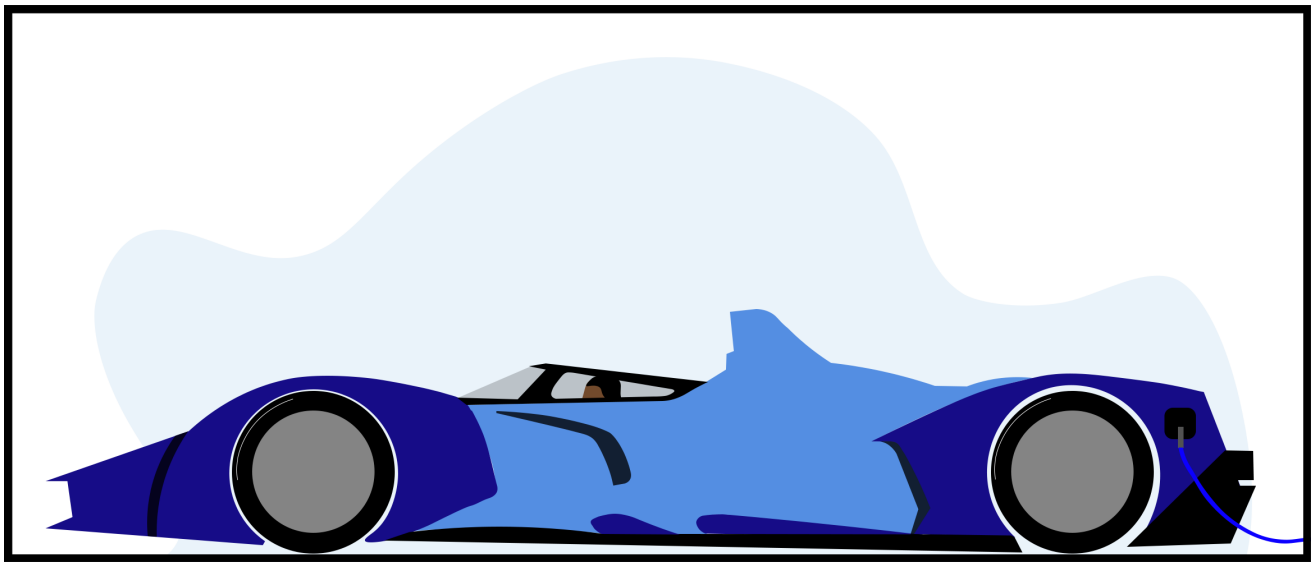
BBC. (2020, January 16). *Rio Olympic Park: Judge orders closure of site over safety concerns*.

BBC News. Retrieved December 10, 2021, from https://www.bbc.com/news/world-latin america-51133312

London 2012 Olympic Games - Global Broadcasting Report. (n.d.). Retrieved December 10, 2021, from https://stillmed.olympic.org/Documents/IOC_Marketing/Broadcasting/London_2012_Global_%20Broadcast_Report.pdf

London 2012 Olympic Games Budget Report. gov.uk. (n.d.). Retrieved December 10, 2021, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1039226/operation-police-powers-terrorism-sep2021-annual-tables.xlsx

Ramaswamy, C. R. (2015, November 30). *Hosting the Olympics: The competition no one wants to win*. The Guardian. Retrieved December 10, 2021, from https://www.theguardian.com/sport/shortcuts/2015/nov/30/hosting-olympics-hamburg drop-out-2024-games



Driven to Evolve: The Changing Values of Motorsport

By Justine Lohmann

Motorsport occupies an essential position within the auto industry, providing visibility and entertainment to millions of consumers every year. The saying "win on Sunday, sell on Monday" acts as a motto for many manufacturers across the globe and generations. In the current day, consumer values have evolved to favour products that not only perform but also are produced in environmentally conscious ways. As motorsport adapts to these new values, its audience adapts with it, as increasingly younger consumers are rediscovering the wonders of racing. Though today, most road-legal cars do not debut on a speedway, they do benefit from years of development and testing of ground-breaking technology created to push high-performance racing to the edge, now with the additional consideration for environmental consciousness.

For over a century, motorsport has developed across the globe, creating its own culture and identity. However, many people both inside and outside these cultures consider auto racing to be only for specific demographics. The main thought by those both inside and outside the industry is often that racing is specific to the older male demographic. This is highlighted plainly in the example of Formula 1 (F1). Often considered the pinnacle of motorsport with the fastest race cars in the world, F1 is an international racing spectacle combining entertainment and innovation. In 2019 the average age of an F1 viewer was 40 with top executives expressing disinterest in any younger viewers (Sylt, 2019). Motorsport tycoon and former F1 owner Bernie Ecclestone said his target audience was the "70-year-old-guy who has cash" (Noble, 2014). The refusal of the world's premier racing series to engage with new generations alienated many, causing its viewing numbers to steadily decline. However, 2021 has seen a 36%

increase in viewers since 2019 and the average age of these viewers is around 32 (Motorsport Network, 2021). This change is not special to F1, motorsport series around the world are experiencing similar resurgences.

The key to this revival of racing has been in how corporations have adapted their product to reflect the emerging consumer values of younger audiences. Today, consumers are far more aware of and motivated towards environmental sustainability (Lai, 2021). Each new generation values sustainability more than the last, with 85% of global consumers indicating that in the past five years they have changed their purchasing behaviour towards more sustainable products and services (Business Wire, 2021). Roughly a third of people globally are willing to pay a premium for sustainably produced products (Business Wire, 2021). This is an opportunity for corporations to capitalize on emerging markets and evolve the perception of motorsport. Many consumers will naturally view motorsport in opposition to their environmental values, however, this provides an ideal sector for racing series to focus on as the sport is pivoting to reflect such values. Referring to F1, in the largest global fan survey the group has ever conducted, fans identified developing sustainable fuels as F1's number one priority as a sport (Motorsport Network, 2021). This survey was also the youngest ever sample recorded with the highest female participation F1 has seen (Motorsport Network, 2021). This is a massive change for the world's largest racing series, putting sustainability as a major priority alongside innovation and spectacle. As motorsport categories around the world shift to accommodate this new consumer model, a few groups have taken the next step in capturing younger audiences through pivoting racing series to focus on the emerging sector of electric vehicles.

In recent years, the motorsport audience has had an entirely new world opened to them: Electric Racing. As electric vehicles grow their market share yearly, a similar hunger for electric racing has shone through. First held in 2014, Formula E (FE) is now the largest electric racing series in the world and is the only single-seater racing series besides F1 to have world championship accreditation. With a cumulative audience in 2018 of 411 million viewers (Nelson, 2021), FE has firmly cemented itself as a reputable global brand and serious racing series, attracting top driving and management talent. The competitors in FE are some of the most revered automobile brands in the world such as Mercedes, Nissan, and Porsche to name a few, and some of the most exciting emerging electric brands such as NIO, DS Automobiles, and Venturi. Similarly, the Extreme E racing series debuted in 2021 to an audience of 18.7 million viewers for its inaugural race weekend (Extreme E, 2021). Extreme E (XE) is an entirely electric global off-road SUV series that requires teams to have one male and one female driver and is unique in its immense focus on environmental sustainability. Travel to locations is entirely by sea freighter which reduces carbon emissions, the main transport ship is a mobile environmental research laboratory, and all events implement a local environmental relief aspect such as collecting waste in local areas in collaboration with the residents. Massive names in motorsport such as Lewis Hamilton, Nico Rosberg, and Carlos Sainz Sr. have teams competing in the series further elevating its stock, and next year luxury automobile brand McLaren will join the field as it expands its electric expertise, already providing the batteries for FE. The status of electric racing has come a long way from being laughed off by motorsport fans to now holding immense market value through effectively understanding audience preferences and creating racing spectacles along the way.

There is still so much for corporations to learn in this field as these series are still in their infancy, however, the

opportunity to capture whole new younger markets while creating breeding grounds for technological innovation is an inviting proposition. Motorsport is pivoting towards new values, a reflection of the world at large. Here we can see the importance of adapting business models to cater towards emerging markets built on the rise of younger demographics. No business exists without the consumer, and often the consumer is the best resource for product development.

REFERENCES

Formula 1 in 2021: Global fan insight into the world's largest annual sporting series (2005-2021). (2021). Motorsport Network. Retrieved November 9, 2021, from https://cdn-1.motorsportnetwork.com/survey/2021/2021-f1-global-fan-survey-motorsportnetwork.pdf

Inaugural extreme E X prix draws global audience of 18.7 million. Extreme E - The Electric Odyssey. (2021, May 19). Extreme E. Retrieved November 9, 2021, from https://www.extreme-e.com/en/news/265_Inaugural-Extreme-E-X-Prix-draws-global-audience-of-18-7-million.html

Koppius, E. (2021, April 15). *Racing to save the earth: Sustainability in motorsport*. DIVEBOMB. Retrieved November 9, 2021, from https://dive-bomb.com/2021/04/13/racing-to-save-the-earth-sustainability-in-motorsport/

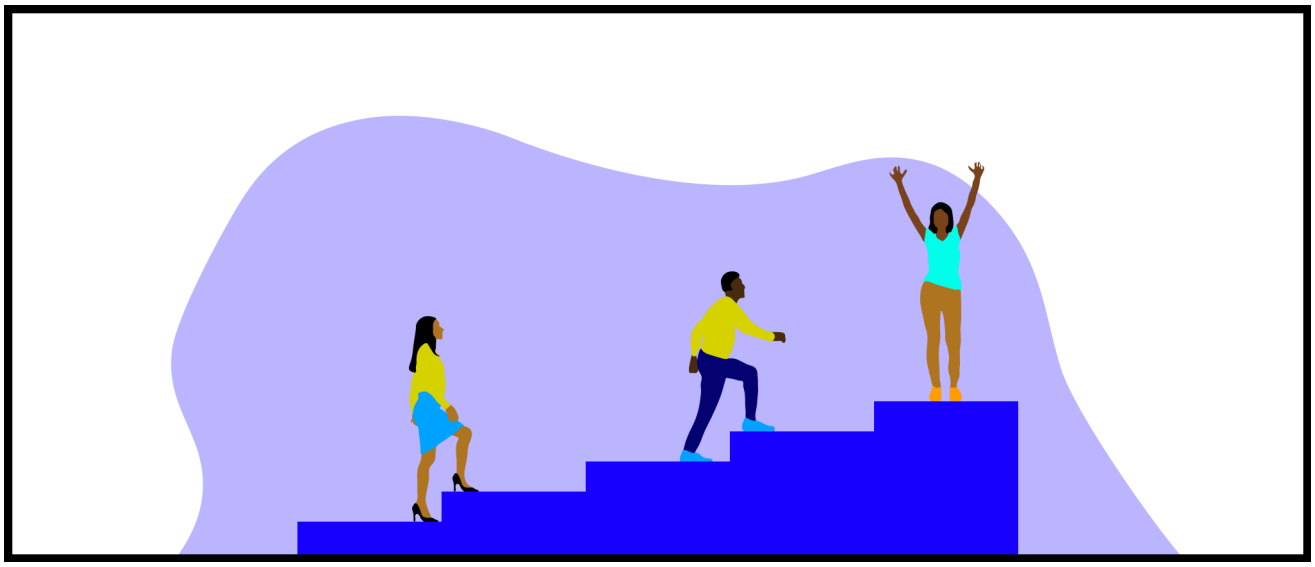
Lai, A. (2021, January 19). *Empowered consumers call for sustainability transformation*. Forrester. Retrieved November 8, 2021, from https://www.forrester.com/blogs/empowered-consumers-call-for-sustainability-transformation/

Nelson, D. (2021, November 3). *Sky sports secures IndyCar rights in key European territories, including UK, until 2024 season.* Motorsport Broadcasting. Retrieved December 8, 2021, from https://motorsportbroadcasting.com/category/ratings/

Noble, J. (2014, November 14). *Bernie Ecclestone: Formula 1 doesn't need young fans.* Autosport. Retrieved November 9, 2021, from https://www.autosport.com/f1/news/bernie-ecclestone-formula-1-doesnt-need-young-fans-5045828/5045828/

Recent study reveals more than a third of global consumers are willing to pay more for sustainability as demand grows for environmentally-friendly alternatives. (2021, October 14). Business Wire. Retrieved November 8, 2021, from https://www.businesswire.com/news/home/20211014005090/en/Recent-Study-Reveals-More-Than-a-Third-of-Global-Consumers-Are-Willing-to-Pay-More-for-Sustainability-as-Demand-Grows-for-Environmentally-Friendly-Alternatives

Sylt, C. (2019, January 13). *F1 reveals that just 14% of its viewers are under 25.* Forbes. Retrieved November 9, 2021, from https://www.forbes.com/sites/csylt/2019/01/13/f1-reveals-that-just-14-of-its-viewers-are-under-25/?sh=3d9481686d5c



The Broken Rung in the Corporate Ladder: Experiences of Visible Minorities

By Manassie Wilson

Representation in Business

For centuries dating back to the Industrial Revolution, the presence of People of Colour (POC) in positions of prominence has been a rarity. This phenomenon can be traced back to the Atlantic Slave Trade, Anti-Asian Violence, and Anti-Latino Discrimination just to name a few. As it pertains to the corporate world, what we see today is a more diverse and inclusive industry. Through necessary controversial conversations that challenge the status quo, business, and all that it entails has seen an increase in the number of (POC) working that makes up its population. Slowly but surely, the racial segregation and discrimination engrained in our society are being broken down. For instance, as reported by The Toronto Star, POCS make up 4.5% of the Canadian corporate sector (Ravilojan, 2020).

Although this number is significantly low it is important to highlight that historically, there was no percentage to represent the presence of POCs in the industry. Therefore, it should be celebrated and seen as a step in the right direction. However, there is more work to be done.

Issues POCs face in the corporate world

According to a study by Dr. Monnica Williams, "stereotypes contribute to keeping people of colour in a disadvantaged status" (Momentous Institute, 2017). With stereotypes such as POCs being perceived as "lazy", POCs are direly affected in completing certain milestones as they relate to career advancement. As a result, opportunities are given to their colleagues to advance in the ranks of the company whilst POCs are left with projects and business undertakings for the company that has little to no impact

on helping them make their way to the top. As a result, some POCs can experience low self-esteem and periods of self-doubt.

Culturally, minorities have a unique way of carrying themselves in all that they do. Nevertheless, an article from BBC News titled "Why it's hard for people of colour to be themselves at work" discusses how minorities seem to code-switch to be accepted in their place of work. Code-switching refers to the way (often marginalized) people conform their behaviour, appearance, and language to corporate culture, which usually tends to be "systemically white" (Ekemezie, 2021). For example, this even goes as far as specifically affecting the way Black individuals wear their hair. Renee Jarvis, an individual cited in the stated article, reveals that she subconsciously puts on a wig to be "more presentable on camera" (Ekemezie, 2021). The notion that a Black woman wearing her hair in its natural state like in the case of Jarvis is seen as unpresentable is mind-boggling. One may suggest that for a reason such as this, she may not be invited to a meeting with a top client because it might not be a "good look" for the company.

One might argue that the world has changed and evolved and that spaces are being made and created for minorities to thrive in the corporate world. As we've seen in the past two years, companies are seen implementing diversity and inclusion into the structure of their companies, with positions being made specifically for POCs. Seems like a step in the right direction, right? Somewhat. A BBC News article suggests that "as companies around the world rush to implement diversity and inclusion programs, the burden to launch these initiatives are unduly falling on employees of colour" (Nance-Nash, 2020). It seems apparent that some of these companies are turning to methods that are the "easiest and most convenient" and utilizing diversity and inclusion as mere buzzwords to avoid backlash from society (Nance-Nash, 2020). Instead of employing surface-level "fixes", the educating aspect surrounding the roots of systemic racial discrimination and its impact on one's career advancement is just as pivotal.

Onward and Upward

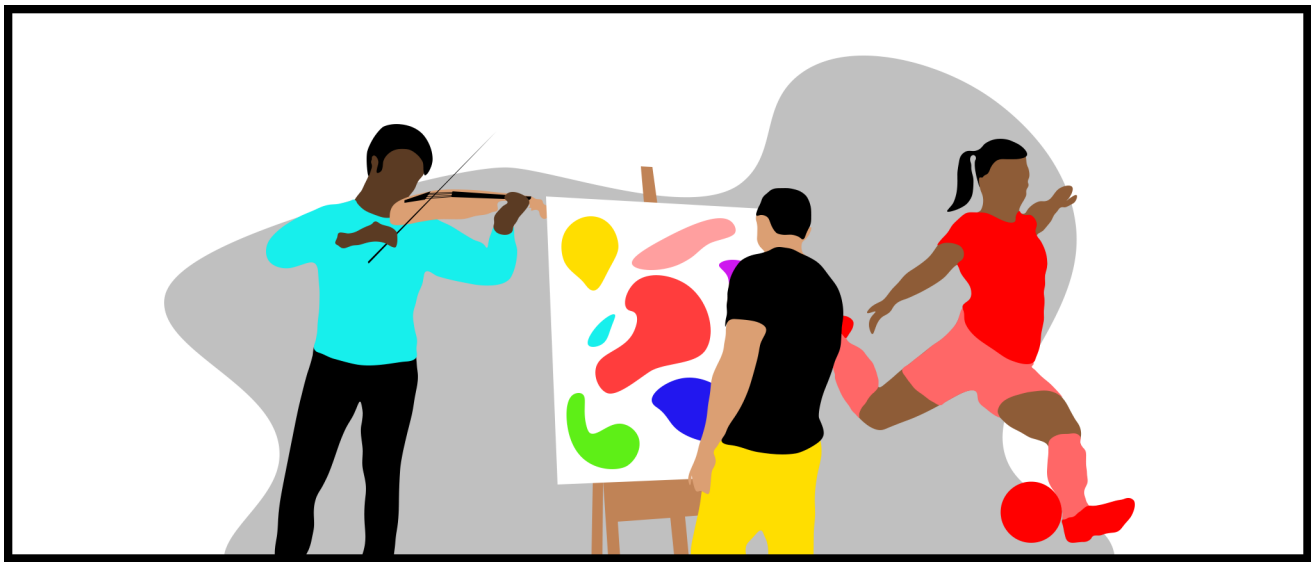
A system that has been prominent for centuries cannot be easily deconstructed in a matter of years. So how do we move forward? By not writing off a person based on their last name on their resume. By giving everyone an equal chance to vie for a position. By making the position available to the person that is qualified regardless of their skin tone. By making opportunities accessible to all. It can be argued that this is easier said than done, however, it starts with one initiative. It is beyond creating a positive image for a corporation. It is about fostering a warm and welcoming workplace for individuals of all stripes. One can promote equality and equity in the workplace through more inclusive hiring practices, emphasizing the importance of training and mentoring programs, bridging the pay gap, and fostering a work environment that embraces differences. The benefits are significant. When adopting proper and valuable diversity and inclusion methods, corporations open doors to attracting and retaining higher talent, increasing overall productivity and collaboration, and enhancing employee engagement (Reynolds, 2018).

REFERENCES

Ekemezie, C. (2021, January 21). *Why it's hard for people of colour to be themselves at work.* BBC. Retrieved November 26, 2021 from https://www.bbc.com/worklife/article/20210119-why-its- hard-for-people-of-colour-to-be-themselves-at-work

Nance-Nash, S. (2020, September 13). *How corporate diversity initiatives trap workers of colour.* BBC. Retrieved November 26, 2021 from https://www.bbc.com/worklife/article/20200826-how- corporate-diversity-initiatives-trap-workers-of-colour

Ravilojan, U. (2020, July 4). *New study finds less than 1 percent of Canadian corporate leaders are Black*. Toronto Star. Retrieved December 12, 2021 from https://www.thestar.com/business/2020/07/04/less-than-one-per-cent-of-corporate-leaders-at-tsx-60-companies-are-black-researchers-find.html



Experiential Learning: A Hands-On Approach to Business

By Taylor Van Hell

The Experiential Approach: Learning Through Doing

Everyone is subject to learning, but to learn is not to be taught but to be done. Learning in educational institutions has always been practiced as a repetitive method of visual and auditory sessions led by a teacher to a group of students. Recently, an innovative experiential approach to learning has broken the status quo of passive learning to create an engaging environment for students to be able to apply and comprehend concepts in a methodology that maximizes career readiness. Through deconstructing the current learning methods practiced in the educational system, the importance and effectiveness of an experience-based approach prevail. Findings on the 'learning through doing' theory conclude with the recommendation to reduce the emphasis on Grade Point Average (GPA) among students. Additionally, it suggests that an increase in experiential opportunities within educational facilities will maximize the retention of learned material, as shown through the success of leading Canadian business educational institutions. Through the introduction of experiential learning, context and understanding are prioritized to maximize retention and future application of the material.

Modern Learning

The modern approach to Canadian learning was adapted from the French regime of the 15th to 18th centuries. At this time, children and families were instilled with the values of learning as a means of productivity and wealth prosperity. Weaving, carpentry, and gardening were emphasized as core competencies to learn by children to provide economic support to their families (Gaffield, 2015). Despite the tactical evolution of curriculum and legislated education over the past four centuries, the core

values of education as a driver for productivity and success remain today. Early schools measured proficiency by the adequacy of performance of practical skills, whereas current institutions equate numerical grade point averages, GPAs, with student understanding and success.

In the 21st century, students, recent graduates, and professionals are expected to prove the quality of learning they have accomplished by providing transcripts and resumes to employers. Learning is quantified by a count of credits accumulated through coursework but is rarely qualified through demonstrating knowledge retention and application. Learning is proven through standardized testing, objective assessment, and cookie-cutter deliverables to be accomplished by all students. Universal teaching methods are understood as a requirement by students to succeed in modern educational institutes.

Mitigating Risks of an Innovative Approach to a Timeless Practice

Educational institutions pressure students to learn through teaching, a cost-effective, low-risk, and low educational outcome alternative to adopting the "learn by doing" experiential approach outlined above. Teaching methods utilized by educational institutions have become the status quo for learning. Adopting a new approach to learning requires disruption in current methodology. Approaching traditional and outdated teaching methods through an innovative lens risk low adoption among older generations. However, this can be mitigated through the proven effectiveness of an action-focused process of learning. Although adopting the doing-based approach increases the risk of failure among learners, because of their lack of experience, it presents the opportunity to strengthen their understanding of context and problem solving within topics, generating a dichotomy between failure and growth.

Away with GPA

For 16+ years of primary and secondary education, students are ranked against each other on an arbitrary graded scale and assigned corresponding letter grades. GPAs are calculated through average class rankings and develop into many students' definitions of confidence and success. With GPAs often drawn from standardized assessments, the scale is an inaccurate representation of a student's ability to utilize, transform, and comprehend skills. The standard of learning is based on a grade point scale that does not allow individuals to prove their understanding, explore surrounding concepts, or take creative approaches to solve problems. As students progress into professionals in the workforce, problem-solving environments simulated through assessments inadequately represent the reality of work. Primary elements of corporate culture revolve around collaborative and creative environments (Coleman, 2013). Neither of these elements is reflected in the formation of learning processes through a standardized quantitative approach. While GPA serves as a baseline of aptitude to various topics, it can not fairly adjudicate a student's ability to excel in a business environment. Where employers seek technical abilities in conjunction with soft skills and workplace fit (Coleman, 2013), GPA standardizes skills into a singular number. GPA serves as an inaccurate metric of a student's true learning, per the "learning by doing" theory and employer recruitment credentials.

Experiential Learning in Business

The diverse ecosystem of businesses cannot be defined by

standard processes, so the adoption of experiential learning allows individuals to solve unique problems and complete diverse jobs methodically. The integration of experiential learning supports individuals with an authentic business experience by teaching realistic requirements for success (Gotto, 2016). Globally, post-secondary business institutions have developed experiential curriculums to replicate business in the real world. Case studies, internships, and business simulations are popular methods of exposing aspiring business professionals to experience learning (Gordon, 2021). Ivey Business School at the University of Western Ontario emphasizes an experiential learning based curriculum. Through exposing undergraduate and graduate students to a plethora of cases and business projects, students experience the dynamics of business beyond the confines of traditional textbook learning. Similar approaches have been integrated into the values of other leading Canadian business schools including the Rotman School of Management and the Haskayne School of Business.

Opening the doors of elevated learning through internships, case studies, and project-based assessments allows learning to form as an experience, to which students recall and apply to real-life scenarios. Readily available experiential learning opportunities prove employability among students. Beyond employment and institutional education, learning is a lifelong process utilized from the cradle to the grave. To learn is not to *be taught* but to *be experienced.*

REFERENCES

Coleman. J. (2013, May 6). Six Components of a Great Corporate Culture. Harvard Business Review. https://hbr.org/2013/05/six-components-of-culture

ESAC. (2018). Essential Facts about the Canadian Video Game Industry 2018. http://theesa.ca/wp-content/uploads/2018/10/ESAC18_BookletEN.pdf

Experiential opportunities - daytime MBA. Haskayne School of Business. (2021, February 23). Retrieved December 23, 2021, from https://haskayne.ucalgary.ca/future-students/mba/daytime/program/experiential-opportunities

Experiential learning. Experiential Learning - Rotman School of Management. (n.d.). Retrieved December 23, 2021, from https://www.rotman.utoronto.ca/Degrees/MastersPrograms/MBAPrograms/FullTimeMBA/Program/ExperientialLearning

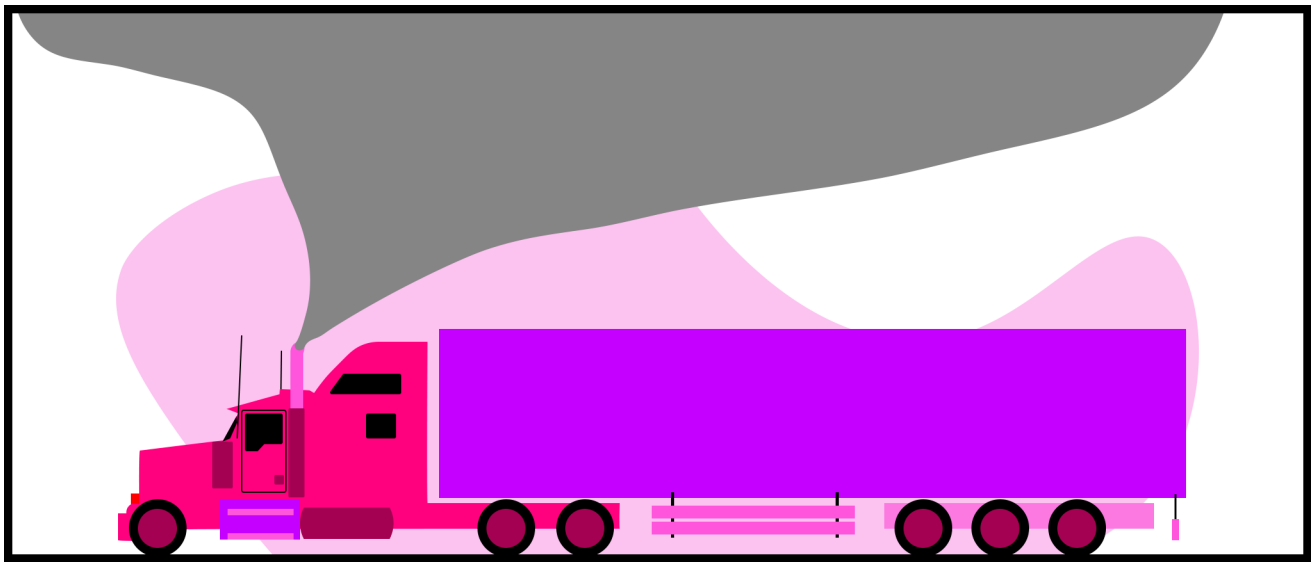
Gaffield, C. (2015). History of Education in Canada. In The Canadian Encyclopedia. https://www.thecanadianencyclopedia.ca/en/article/history-of-education

Gordon, J. (2021, September 28). *Experiential learning in business schools - explained*. The Business Professor, LLC. https://thebusinessprofessor.com/en_US/profession/experiential-learning-in-business-schools

Gotto, R. (2016, June 6). *Eight reasons why experiential learning is important in business*. Eight Reasons Why Experiential Learning is Important in Business | Saskatchewan Research Council. https://www.src.sk.ca/blog/eight-reasons-why-experiential-learning-important-business

Ivey Business School. (n.d.). *Honours Business Administration - Business Degree: Ivey Hba*. Ivey Business School. https://www.ivey.uwo.ca/hba/

Kiener, M., Green, P., Ahuna, K. (2014). Using the Comfortability-in-Learning Scale to Enhance Positive Classroom Learning Environments. Maryville University. https://files.eric.ed.gov/fulltext/EJ1035847.pdf



The Past, Present, and Future of Sustainable Trucking in Alberta

By Joshua Fuerbringer

Environmental Impact of Trucking

Compared to other methods of transport, overland trucking is notoriously inefficient. While advances in technology have allowed the modern train to go nearly 200 kilometres on one litre of fuel, efficiency of the internal combustion engine (ICE) in tractor trailers has not dramatically increased since the seventies. A diesel burning ICE gets less than 11 kilometres per litre, and this is only in the very newest of semi-trucks (Palmer, 2014). The environmental impact of using trucking as the main mode of transport for the majority of goods is profound. In 2020, using a weighted average annual daily traffic metric (WAADT) and multiplying by the average emissions for a diesel truck, we calculate that approximately 972,000 tonnes of CO_2 were released by diesel trucks travelling on Highway 2 between Calgary and Edmonton alone (NPRI, 2009).

This calculation only accounts for CO_2, diesel burning engines also create many other emissions; it can be reasoned millions of tonnes of GHGs like carbon monoxide, nitrogen oxide, complex hydrocarbons, and other particulate matter were also released along this route within this same time span (Reşitoğlu et al., 2014). It should be noted that due to the COVID-19 pandemic, road traffic has irregularly decreased and that emissions in a more regular year have been even higher than that in 2020.

Trucks are Ubiquitous

After learning about the gross inefficiency and environmental impact of trucking, one may reasonably ask: Why are trucks still utilized to transport goods? In Canada, the existing logistical infrastructure precludes the use of trucks as the chosen form of transportation for trade.

Compared to the United States, Canada is sparsely populated and has very few navigable rivers. For much of Canadian history, long distance travel had to be undertaken by portage, a time consuming and very risky form of transport that was good for fur trading and not much else. Even when rail became the preeminent form of transport in Canada, transporting goods away from towns with train stations was often done by horse and buggy, often leading to overly expensive goods and long supply chains (Marsh, 2021). The creation and widespread adoption of the ICE changed all of this. Starting in the early 1940s with the creation of Alberta Highway 97, a vitally important road and a component of the Alaska-Canada Highway that connects the continental United States to its far off state of Alaska, the process of building "interstates" in Canada started for the first time. Culminating in the landmark Trans-Canada Highway Act of 1949, it was decided that the entirety of Canada, from sea to sea, would be connected by a network of paved, multi-laned roads to facilitate transport via automobile (Trans-Canada Highway, 2020). The decision to undertake this expansive infrastructure project was obvious, linking major metropolitan areas via road would allow the transport for both goods and people at low costs never before seen. Automobiles are also incredibly versatile; trucks can fit on roads in even the tightest of city centers, and they can operate on long-haul routes taking goods with ease, regardless of the amount of distance. Soon after the implementation of the Trans-Canada Highway Act, transport utilizing ICE surpassed rail as the predominant form of transport in Canada. There are 35 million automobiles registered in Canada with over 90% of all goods transported by truck (Statistics Canada, 2020). Other, more efficient and eco-friendly alternatives exist, but it is simply easier to use trucks in the transport of goods. Canada has built a system that favours the use of tractor trailers as the preferred method of transport and as a result, Canadians have been continuously experiencing the environmental consequences of building this vast road network.

The Importance of Alberta Highway 2

Containing approximately 75% of the province's population, the Calgary-Edmonton Corridor is the cultural, economic, and population center of Alberta (Johnston, 2019). Acting as the logistical spine for this vital region, Alberta Highway 2 (Highway 2) links the different municipalities located in the corridor to one another. The most trafficked portion of this highway lies in between Edmonton and Calgary, however, the highway also composes part of the equally vital CANAMEX Trade Corridor that links Northern Canada and Alaska to Mexico (Thompson, 2005). The importance of this trunk road cannot be overstated. Millions of tonnes of goods flow through this trade route per year, using WAADT, over 1.2 million tractor trailers navigated the Highway 2 Corridor between Calgary and Edmonton in the year 2020 (Alberta Transportation, 2021).

The Future of Transport is Here

The good news is, due to incredible development in logistical technology, the future looks a lot more "green" for the trucking industry. The trucking industry in Canada is already worth approximately $26 billion, and there are a plethora of companies developing fully electric tractor trailers to raise this figure even further. Established brands like Volvo, Daimler, and Byd are joined by new market entrants like Rivian, Tesla, and Workhorse in this electric truck arms race (Vaughn, 2021). The new developments in trucking are not limited to the actual trucks either. eHighway is a new electrification infrastructure system by

Siemens that allows trucks, either fully electric or in an adapted hybrid system format, to be charged or operated completely on electricity while travelling on trunk roads similar to that of Highway 2. Siemens believes that not only will this system allow for more environmentally friendly trucking practices, but that it will also be profitable for the infrastructure owner, the truck operators, and power providers (Scott, 2021). Canada has set goals in its efforts to fight climate change. Canada desires that most, if not all, cars, regardless of size, to be zero emissions by the year 2040 (Transport Canada, 2021). To reach this metric, Canada will have to do more than just put limits on the kind of automobiles that can be sold. Implementation of transport supporting technologies like eHighway will be fundamental in reducing the national climate footprint. It will take capital, time, and even more technological development, but in addition to these aspects, a strong effort by governments and corporations to reduce the environmental impact of trucking will truly disrupt the logistics industry.

REFERENCES

Alberta Transportation. (2021). *Alberta Highways 1 to 986 Traffic Volume History 2011 - 2021*. CornerStone Solutions Inc.

Johnston, S. (2019, July 9). Forecast says corridor between Edmonton and Calgary will boost Alberta population to 6.6m. Retrieved from https://globalnews.ca/news/5458516/alberta-population-6-million/.

Marsh, J. (2021). Railway History in Canada. In *The Canadian Encyclopedia*. Retrieved from https://www.thecanadianencyclopedia.ca/en/article/railway-history

Mieles, C. (2021, May). Long distance trucking in Canada. (IBISWorld Industry Report 48412CA). Retrieved from IBIS World: http://www.ibisworld.com

NPRI. (2009). National Pollutant Release Inventory. The Government of Canada.

Palmer, B. (2014, March 3). Let's make an effort to move more freight by rail and less by road. trains are more efficient. Retrieved from https://www.washingtonpost.com/national/health-science/lets-make-an-effort-to-move-more-freight-by-rail-and-less-by-road-trains-are-more-efficient/2014/03/03/d1947278-9d90-11e3-9ba6-800d1192d08b_story.html.

Reşitoğlu, I., Altinişik, K., & Keskin, A. (2014, June 11). *The pollutant emissions from diesel-engine vehicles and exhaust aftertreatment systems*. Clean Technologies and Environmental Policy. Retrieved from https://link.springer.com/article/10.1007/s10098-014-0793-9.

Scott, T. `. (2021). *The highway where trucks work like electric trains*. YouTube.

Statistics Canada. (2020, May 14). *Commodity flows by mode in Canada: Canadian Freight Analysis Framework, 2017.* STATCAN.

Statistics Canada. (2020, October 9th). *Vehicle Registrations, by Type of Vehicle, 2020.* STATCAN.

Trans-Canada Highway. (2020, August 10). *Full history of the trans-canada highway*. Trans-Canada Highway. Retrieved from https://transcanadahighway.com/general/full-history/.

Thompson, R. (2005). *Canamex Trade Corridor*. Alberta Infrastructure and Transportation. Retrieved from https://web.archive.org/web/20060719165605/http://www.infratrans.gov.ab.ca/INFTRA_Content/docType59/Production/pol295.htm.

Transport Canada. (2021, November 10). *Minister of Transport Advances Canada's efforts to fight climate change at COP26*. Canada.ca. Retrieved from https://www.canada.ca/en/transport-canada/news/2021/11/minister-of-transport-advances-canadas-efforts-to-fight-climate-change-at-cop26.html.

Vaughn, M. (2021, November 29). *Yes, electric big rigs are coming-and we drive four of them*. Retrieved from https://www.autoweek.com/news/green-cars/a36506185/electric-big-rig-semi-trucks/.

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