



RESEARCH ABSTRACTS

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Institute for Management & Innovation
UNIVERSITY OF TORONTO
MISSISSAUGA

Examining Household Disposal Practices of Unused and Expired Medications in the City of Mississauga and the City of Toronto

Angelica Adams

The presence of pharmaceuticals has been regularly detected in surface, drinking, and ground waters for the past twenty years. Human excretion of medicines has been recognized as the main route of pharmaceutical entry into the environment, however household disposal methods (e.g., putting in the garbage, flushing down the toilet, pouring down the sink) also contribute to the global issue of environmental pollution associated with these chemicals. While research has focused on detecting pharmaceuticals in the environment and medication disposal practices among people in several countries are important, studies to date have overlooked household disposal methods especially in the Canadian context. Thus, this novel research is important as it represents one of the few studies in Canada that attempts to capture behaviours and attitudes towards prescription and non-prescription medication disposal. This research uses data from self-administered paper and online surveys completed by 513 participants in the City of Mississauga and the City of Toronto, Ontario. The research reveals a number of key findings. In particular, despite the existence of a provincial takeback program in Ontario, only 31 percent of participants were aware of pharmaceutical disposal programs and usage remains at a relatively low level (12.2%). The most commonly reported method for disposal of unused and expired medications in households is disposal in the garbage (52.2%). Roughly equal percentages of participants agree that that the producers of pharmaceutical products, pharmacies, health care professionals, and patients share an equal responsibility to safely dispose of unused or expired medications (44.3%, 45.3% and 37.6%, 48.9%, respectively). The barriers identified for not discarding medications at the pharmacy were inconvenience (27.6%) and availability of time (25.1%). There is little awareness among the public regarding appropriate ways to dispose of unused medications. This research provides insight into Canadian awareness and practices concerning pharmaceutical waste and suggests the need for raising awareness to reduce the release of these substances into ecosystems.

Developing A Climate Change Resiliency Strategy for the Tourism Industry in Dubai, the United Arab Emirates through Policy Analysis.

Athbah Almuhairi

The instability of climatic conditions anticipated by anthropogenic climate change threatens tourism flow; however, research into tourism sector resilience for desert climates is lacking. For cities like Dubai that invest in the tourism sector as part of an economic diversification strategy, climate change impacts to tourism flow imply slower return on investments. The aim of this research is to define a climate change resilience strategy for Dubai through a policy analysis supported by a literature review. Global, national, and local policies were selected for specific arid land typologies and availability of climate resilience policy. Policy recommendations utilise the policy triangle framework, defining the context, content and implementation process for suggested governance, social, economic, and environmental resilience strategies. Strategies include diversifying tourism offerings, proactive knowledge dissemination during crises, fostering collaboration and communication between stakeholders, and safeguarding the natural and built environment. The resilience strategy is a jumping-off point for tourism sector climate adaptation policies in desert climates and is a basis for the development of climate resilience strategies in other sectors such as financial services, manufacturing, and retail.

Species At Risk and Sustainability: A Case of the Niagara Region

Allegra Bethlenfalvy

The biodiversity crisis is a pressing global issue. In Ontario, Canada, species-at-risk are protected under the Endangered Species Act (2007). The current government amended that legislation through the More Homes, More Choice Act (2019), leaving species at risk with an uncertain future. This paper aims to understand these amendments and what the implications are for species at risk in Ontario. Additionally, the paper explores sustainable development through a case study of the Niagara Region. After compiling a list of regional species at risk, the methods of ground verification and interviews were carried out. The results indicate a total of 71 species at risk that exist in the Region, 37 of these species are globally stable, resulting in 17 of them potentially losing their recovery strategies. Development activities currently exist in the Region, but sustainable development is not seen as a priority when planning projects. Finally, uncertainty surrounding the amendments to the ESA is still a concern for many, but all participants agreed that species at risk do matter to humans.

Understanding the Influence of ‘Flight Shame’ as a Nudge for the Air Transportation Industry and Consumers Through Media Content Analysis

Ty Bryant

As the fastest mode of transportation available, air travel provides the fundamental links for products and people to travel across economic and social networks. Despite its central role in sustaining global interconnectivity, the necessity of air transportation has been called into question by the novel flight shame movement. Since its inauguration in late 2018, it has received international media attention, motivating individuals around the globe to avoid the use of air transportation. This study uses media content analysis in furthering the current understanding of how flight shame may act as a nudge for consumers and the air transport industry in adopting more sustainable practices. Evidence for nudging by shaming was prominently recognized in flight shame-related online news media content. Online news media may be challenging pre-existing norms with respect to air travel by editing reader's choice architecture and placing social pressure on individuals to better integrate elements of environmental stewardship into decision making. Nudging towards the air transport industry is also common amongst online media, where industry firms are called to take further action in managing the greenhouse gas emissions resulting from flight operations. The common attitude-behavioural gap and the lack of viable transportation alternatives were identified as key limitations to the effectiveness of flight shaming. Further research is required in order to determine the direct correlation between the flight shame movement and changes to consumer demand for air transportation.

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Materiality Issues In The Launch Services Sector: In Search Of A Sector Specific Sustainability Framework

Atupele Chakwera

Space-based sensors such as satellites have played an enormous role in improving the science and data around sustainability. These technologies allow us to engage in many sustainability-focused activities such as the monitoring of illegal unregulated and unreported fisheries. Moreover, space agencies such as NASA have been instrumental in shaping our understanding of climate change.

The space industry is vast and made up of many sub-sectors, such as satellite manufacturers and ground support providers. Therefore, this research project focused solely on Launch Service Providers (LSP), which are organizations that focus on launching spacecraft beyond our atmosphere, looking at both public and private sector organizations. This paper seeks to understand current organizational performance and areas of focus when it comes to sustainability in the launch services sector.

Of the 32 organizations in the industry researched, less than 5 had a comprehensive strategy, although some industry players such as the ESA and Arianespace are performing well. At an industry level is that there appears to be growing stakeholder pressure for improvement as well as significant sustainability concerns throughout the industry regarding space debris. At the same time, very few organizations appear to be conducting environmental assessments of their rocket launches that go beyond compliance. Moreover, there is a need for organizations to be doing more sector-specific evaluations while focusing less on generic CSR disclosures. Lastly, few are tracking metrics, and most sustainability seems to be qualitative. This research paper seeks to develop a framework that can be developed by the industry to improve sustainability.

'Buying into Sustainable Menstruation': Investigating the impacts of a Sustainability Information Campaign on Willingness-To-Pay for Menstrual Cups

Gillian Davison

Sustainable menstruation refers to the practice of using menstrual hygiene products which benefit the user's physical health, social and economic wellbeing, and minimizes negative environmental impacts. Sustainable menstruation in Canada is impeded by the popularity of and partiality to disposable products like sanitary pads and tampons. There is limited research on the reasons women prefer these products or whether sustainability awareness plays a role in consumer behaviour related to choice of products like menstrual cups. This study explored the impacts of a sustainability information campaign on demand for the DivaCup menstrual cup among students at the University of Toronto. This study used a mixed-methods approach involving a survey to assess participants' knowledge, preferences, and priorities related to menstrual hygiene products followed by an experiment to identify their maximum willingness-to-pay (WTP) for the DivaCup after receiving information regarding the product's socioeconomic or environmental sustainability. Linear regression and descriptive analysis were used to evaluate experiment results and qualitative survey data, respectively. The analysis revealed an overall positive WTP for a DivaCup after receiving sustainability information treatments. Participants who prefer using insertable products were more likely to consider purchasing the product than women who do not and offered a significantly higher WTP after receiving information on the DivaCup's socioeconomic benefits compared to other information. The general lack of information and incentive received by young Canadians regarding sustainable menstruation hinders the adoption of sustainable product alternatives. To this end, it is recommended that sustainability topics be integrated into formal education for young individuals together with information campaigns and government subsidization of sustainable menstrual hygiene products, like menstrual cups, in order to increase demand while reducing waste, generating cost-savings for stakeholders, and grow support for the trend of sustainable menstruation across Canada.

Green Advertising Strategies for Consumer-Packaged Goods: Systematic Review & Case Study

Allie Douglas-Vail

The purpose of this study was to gain an in-depth understanding of the application of green advertising strategies in the consumer-packaged goods industry and collect empirical data regarding the execution of strategies through a case study. This was accomplished through a combination of a systematic review and a magazine print ad case study examining women's fashion, men's fashion/fitness and lifestyle magazines. Main findings contribute that advertising professionals must have a firm understanding of their target market and the related implications of their consumers having either low or high environmental concern. Multiple appeal types were mentioned in the literature and were incorporated into the case study analysis. Functional and personal gain appeals were most common, with a significant association between these and the gendered magazine sectors. Finally, the case study found consistent results across three magazine sectors, highlighting that the majority of green advertisements featuring consumer-packaged goods in magazines share the following traits: targeting personal health preservation, featuring a product/service green promotion, environmental claims for a given product, the use of green executional elements, with few third-party verifications. These results provide a concise summary of current literature available pertaining to green advertising and implications on consumer purchasing intentions with consumer-packaged goods. The case study offers a real-life application of green marketing strategies to further supplement the content analysis.

Physical Accessibility and the Built Environment: A Case Study Examining the Relationship Between Building Design, Era, Purpose, and Designations at the University of Toronto

Rebecca Fortenbacher

The design of a building greatly impacts the accessibility of a space, removing barriers that prevent individuals with mobility disabilities from using the structure. Providing accessible post-secondary institutions is important to allow individuals to access higher educational opportunities and become socially sustainable.

This study was intended to understand the level of accessibility at the University of Toronto and assess whether the date a building was built, whether it was modified, its purpose(s), and historical and LEED designation are predictive of the level of accessibility. A case study was conducted at the University of Toronto on both the St. George and Mississauga campuses to evaluate the accessibility within buildings. This study used a mixed methods approach, including an accessibility audit and compilation of data into a master database. The accessibility audit included 30 questions covering five main categories of accessibility: entrances, washroom, horizontal circulation, vertical circulation, and goods and services. The main floor of a total of 84 buildings was evaluated, 73 at UTSG and 11 at UTM.

The results of this study show that the date a building was built and whether it was modified are significant predictors of a building's accessibility. This indicates that newer buildings are less likely to have been modified and are more likely to be accessible. Horizontal accessibility is the strongest aspect of a building's accessibility score. In general, the University of Toronto provides a decent level of physical accessibility for students on each campus, representing the accommodation model accessibility type. Most buildings comply with the required standards, with modifications being undertaken for those that are not in compliance. Though, there is still a long way to go in the incorporation of accessibility within this university. This paper provides significant insights into the complexity of determining whether a building is accessible. There are a number of variables that need to be considered when incorporating accessibility into an existing or new building. The findings imply that providing accessible spaces for students is important to enhance their learning environment and is an indication of strong social sustainability.

Canadian Banks and Sustainable Development

Ana Karina Gutierrez

A benchmark study of the top five Canadian banks is presented, inquiring into the extent to which they have integrated sustainable finance commitments into their overarching sustainability strategies. This research paper explored the existing literature regarding the role of financial institutions in sustainable development and sustainable finance. The paper then analyzed the current sustainable finance commitments released by the top five Canadian Banks: Toronto Dominion Bank, Royal Bank of Canada, Bank of Montreal, Bank of Nova Scotia and Canadian Imperial Bank of Commerce. The last step was an evaluation utilizing the World Resources Institute framework that involved looking into the commitments' specificity, accountability and magnitude. Furthermore, the research discerned three key findings: the gap in variability among banks' sustainable finance commitments terms and definitions, the poor performance on disclosing methodology to measure commitments and the discrepancy between the magnitude of sustainable finance commitments and the amount directed towards fossil fuels financing.

Integration of Refugees that Identify as Queer in Canada

Chris Hage

This research paper addresses issues pertaining to the integration of refugees that identify as queer, with a focus on Toronto, Canada. Queer refugee frameworks were established through a literature review of the publications available. In turn, that was used to analyze two interviews conducted with case workers at Sherbourn Health in Toronto to assess the Canadian integration processes available. The results were segregated into three categories to address the key objectives: (1) Identify challenges that are associated with queer refugee narratives in Toronto; (2) Identify resources available and challenges faced by case workers in Toronto; (3) Define action points that should be implemented to improve integration processes of queer refugees. The results show that the lack of understanding the intersectionality between sexual, racial and cultural identities leads to the failure of refugee integration systems. That hinders the ability of queer refugees to find adequate shelter, establish safe support groups, manage the legal system and receive appropriate healthcare assistance. Additionally, the structural shape of governmental bodies and organizations contribute to a power imbalance that allows the state to improve its charitable liberal image internationally without providing services and conforming to human rights acts. Finally, the actionable points were used to develop recommendations on governmental, organizational and academic levels; all of which revolve heavily around accounting for the individual experiences of sexually diverse refugees.

Implications of Being a Parent for People's Attitudes toward Environmental Issues; Do Parents Care about the Environment More than Non-Parents?

Takuya Harada

While there are studies warning of environmental impact brought about by population growth, several studies suggest that having children induces pro-environmental behaviors among parents. The conflicting views limit decision-makers' ability to craft an environmentally judicious population strategy. This study conducted a survey targeting Americans that live in California, are in their 30s and have completed post-secondary education to seek the answer for the following research question: do parents care about the environment more than non-parents in such a way that the potential increased environmental impact brought about by having children would be offset? In the survey, participants were asked to indicate the importance of various decision factors under three scenarios: 1) ordering a meal, 2) purchasing a car and 3) voting. In each scenario, one environmental factor was provided. Participants' attitudes toward environmental issues were measured based on how they valued environmental factors in relative terms (based on ranking) and absolute terms (based on Likert scale). Survey responses were classified based on participants' parenting status, and the study inspected the difference in how people in different groups valued environmental factors. Analyzing 405 responses, the study concluded that parents care about environmental issues less than non-parents in relative terms. This is due to the financial burden and practical demands associated with childrearing, which increased relative importance of non-environmental factors in their decision-making, overshadowing the importance of environmental factors. This trend was more noticeable among female parents. On the other hand, there was no difference in how parents and non-parents valued environmental factors in absolute terms.

Enabling a Sharing City for Economic Resiliency, Sustainability and Social Capital

Courtney Hayes

Toronto's Sharing Economy (SE) exemplifies avenues for sustainability, social equity and capital, economic efficiency, a radical challenge to market capitalism, and a new urbanism. Despite failing to provide a conclusive definition, both academic literature and public discourse is dominated by large multinational platforms like Uber and Airbnb that mirror traditional industries that embody exploitative labour relations and transnational gentrification under the guise of sharing. As adoption of a term is reflective of socio-political contexts, this research conducted a discourse analysis of interviews with actors of Toronto's SE to uncover the following: How is the SE discursively produced in Toronto? What social structures and power dynamics are implicated? How do these actors view the existing and future SE landscape?

The results articulate a co-optation by commercial platforms, and Uber and Airbnb have hegemonically dominated governments perception of SE which can delegitimize or undermine the potential of true sharing initiatives. Toronto has a robust grassroots SE that is largely a response to expensive, high density urban environments, stimulated by growing public awareness of sustainability and changing consumer preferences, but limited in terms of capacity and ideological barriers. Select organizations interact with city departments but support is siloed and reactionary. This is reflective of city priorities in an entrenched market capitalist system. It is imperative that councilors acknowledge SE and integrate models to high level goals using a systems thinking approach, provide institutionalized support while removing barriers to sharing, and taking on a communicator role on behalf of existing organizations.

Determining which Employee Engagement Practices are Most Valued Relative to Generational Variability

Yosua Husodo

The rise of millennials entering the workforce drew significant attention to researchers trying to determine changing patterns of organizational behaviour. Studies have shown a declining rate of employee engagement, causing challenging issues pertaining to unsustainable organizations, corporate culture, as well as hefty financial implications. This study seeks to determine how we can increase employee engagement by determining which practices are most desired by specific generations. A literature review was conducted to better understand why generational gaps occur. Additionally, a public survey was launched to develop a better understanding of what each generation value most based on the cognitive gaps identified through the literature review. The data obtained showed that Gen-X prioritizes Value Alignment while Gen-Y prioritizes Learning & Development. While this is true to the sample size, further study needs to be conducted in order to gather a more accurate conclusion for the general population. Interestingly, while Millennials generally have lower average values, the variability between practices is much lower which shows that younger generations seek a more holistic approach to employee engagement as a strategy to develop a sense of emotional attachment, enthusiasm, commitment to the organization.

Factors Motivating the Legal Recognition of Nature's Rights – The Case of River Whanganui in New Zealand and Lessons for Environmental Decision Making

Rini Jacob

A fascinating movement has been unfolding globally – within the past two decades several national and international decisions have emerged that recognize nature as a “subject of rights”. Several courts and legislatures around the world have recently attempted to give non-human natural entities legally enforceable rights as a way to protect the natural world. In 2008, Ecuador, for instance, became the first country to recognize nature as a rights holder in its Constitution. Following this model, several other countries, including Bolivia, Colombia, India, Australia and the U.S have also attempted to give rights to nature and natural entities. Recently, New Zealand, recognized its longest navigable river, River Whanganui as a legal person, making it the first waterway in the world to be given rights. This global “Rights of Nature” movement presents a critical turning point in environmental decision making. Not only are rights of nature decisions a stark deviation from existing “human-centric” approaches to environmental governance, they also have significant socio-political and economic implications. This prompts one to consider what is motivating nations to pursue such decisions despite the challenges they pose. In the face of a worsening planetary crisis and weak global actions, rights of nature presents a unique exemplar in international environmental efforts, one that could potentially provide us with insights on motivating more sustainable environmental decisions. This paper examines the motivations behind rights of nature decisions and what lessons they might have to offer future environmental decision making by evaluating the case of River Whanganui in New Zealand. The study highlights important links between Indigenous rights and rights of nature decisions. The example of River Whanganui signifies that Indigenous justice can become a pathway for more sustainable environmental solutions and provides significant insight on engaging Indigenous communities in environmental decision making.

Evaluating the State of Environmental Sustainability Disclosure for Canada's Largest Alpine Ski Areas: An Exploratory Research Study

Jonah Kahansky

Anthropogenic climate change is predicted to have widespread impacts across Canada, including increases in mean temperature, reduced snow accumulation across southern Canada, and particularly dramatic climatic changes at high latitudes. Climate change thus poses an existential threat to many alpine ski areas, all of which are inherently climate dependent. In response, the ski industry is being increasingly pressured by customers, external investors, regional governments, and other stakeholders to disclose both the environmental impacts of their operations, as well as their strategies to adapt/mitigate to long-term climate threats. This paper explores the current state of environmental sustainability disclosures among Canada's largest alpine ski areas, with the objective of providing a baseline to make future improvements. A Disclosure Quality Index (DQI) was created to assess the disclosure levels of Canada's 50 largest ski areas, based on 31 unique disclosure elements. Results indicate that 44% of the sampled ski areas have some level of environmental disclosure, with DQI scores ranging from 0 to 42 (from a maximum possible score of 62). DQI scores were found to be correlated with ski area size (in elevation and skiable acres), ownership structure, membership association, provincial jurisdiction, and park status. Data results, in combination with literature review findings, suggest that greater industry standardization for disclosure, increased membership association participation and facilitation, and the creation of clear and consistent sustainability strategies within individual ski areas, are important factors in advancing environmental sustainability disclosure within Canada's ski industry.

Hydropower Dam Development in the Mekong Region: Building a Sustainable and Equitable Future

Nikita Kumar

Hydropower dam development is occurring at a fast past in the Mekong region. This has major environmental impacts on surrounding ecosystems, as well as several socio-economic implications for local communities living along the river. This study aims to understand how the literature frames and contextualizes sustainability issues related to hydropower dam development along the Mekong River. In addition, this study seeks to examine the types of recommendations proposed in the literature which encourage a shift towards more sustainable and equitable hydropower dam development. The results of the literature review found that the main causes attributing to unsustainable and inequitable hydropower dam development include the influence of geopolitics, poor water governance and collaboration systems, as well as ineffective data collection and haring and methods. Moreover, this study identified two main solutions proposed in the literature for moving towards more equitable and sustainable processes, which include improving knowledge-sharing mechanisms and engaging in more meaningful stakeholder participation and collaboration. Finally, the study identified a number of gaps in the literature, such as a limited focus on sustainable alternatives and innovations within the hydropower industry, the role of responsible investment, as well as stakeholder action and perceptions of dam development. Therefore, the findings illustrate an urgency to advance the literature surrounding hydropower dam development in the Mekong region to better reflect the earth's current state and growing awareness of the implications associated with damming the Mekong River.

How Can Sustainability Apps Influence Responsible Consumption?

Amine Mikati

The global consumption of natural resources exceeds the rate of their generation. So, the world is in dire need to transition towards a more responsible consumption behaviour. The widespread of mobile phones can facilitate this transition through sustainability apps. Sustainability applications refer to mobile applications that provide users with suggestions or detailed information to reduce their environmental or social impact. The paper focuses on understanding the influence that sustainability applications can have on people's consumption behaviour.

By leveraging various data collection means, such as a focus group, a survey, and structured interviews, the study's focus was achieved. The focus group defined Sustainability applications. The survey provided participants with scenarios about different products, with the aim of understanding participants' likelihood of changing their state behaviour. The interviews conducted provided insight into people's actual behaviour changes based on the use of sustainability apps.

Learning new information can influence people's decisions, up to a threshold, and sustainability apps help people reach that threshold. The results of this study show that sustainability apps can change people's behaviour by providing educational information or raising awareness.

Strategies for public education and outreach in urban forestry: A case study in six Southern Ontario cities

Lauren Morante

This case study examined mechanisms used in urban forestry public education and outreach in six cities in Southern Ontario. Many urban trees and viable planting space occur on private property, meaning management strategies often rely on coordinating disparate stakeholder groups with varying attitudes towards trees. Effective outreach and education programs are crucial to promote proper management of trees by property owners. Trees in cities provide many beneficial ecosystem services, alongside aesthetic and cultural benefits to citizens. Cities included in this study are Guelph, Kingston, Kitchener, Oakville, Toronto, and Richmond Hill. All cities engaged various print, online and in-person outreach material. Stronger outreach programs used a wide variety of mediums to share information, which increased the likelihood information reached target audiences. All cities recognized the importance of a strong online presence, particularly social media, but few had online platforms dedicated to forestry efforts. Many cities identified difficulties engaging with groups that have limited online presence, particularly seniors. However, these groups often represent a sizeable portion of property owners and effort should be made to engage them. Cities identified the need for proactive management strategies when considering threats of climate change, invasive species, and development. Urban forests can provide mitigation from the effects of climate change but can only do so if they remain healthy and viable. Maintaining a healthy urban forest is partly made possible by property owner knowledge of and compliance with urban forestry management practices. Urban forestry outreach and education is incredibly important to ensure property owners receive appropriate information to care for and maintain trees.

On Thin Ice: Vulnerability and Resilience of Ontario's Urban Ice Fishing Communities

Kamil Musielak

One consequence of anthropogenic climate change is the increased variability and overall decline of winter lake ice cover across the global north. Ice fishing on frozen lakes is a socially and economically significant winter activity in Ontario but is under threat as its availability decreases. At the same time, unprecedented urbanization means that ice fishing no longer takes place only in remote regions but is enjoyed within many urban environments. While some research has already quantified the economic implications of climate change to Ontario's ice fishing industry, this study employs a systems perspective to explore how the potential loss of ecosystem services and social capital built on urban ice fishing may influence ice fisher behaviour and the resultant impacts on the industry. Three unique urban ice fishing environments within Ontario were studied to gather demand- and supply-side perceptions about climate change and urbanization to inform evaluations of community vulnerability. It was found that, despite differences in each ice fishing community's exposure to climate change, the sociocultural importance of ice fishing played an important role in their vulnerability and urbanization presented a significant opportunity for industry to secure climate change resilience in the near-term.

Determining the Impact of Blockchain Technology on Carbon Markets

Rishabh Nanda

Putting a price on carbon emission has really helped the world to reduce global emissions. This approach has led to development of carbon markets especially emission trading schemes (ETS). In emission trading schemes, different players such as buyers and sellers trade for emission offset credits. However, this trading platform has some big challenges which are required to be resolved for better environmental impact. Some of these challenges are lack of transparency, less accessibility, corruption, slow processes and cost. Many studies have suggested to implement blockchain technology by developing a platform where trading can happen openly and transactions are tracked responsibly. This study engaged three key players of a current ETS i.e. emitters, offset developers and hedge funds to gain their insights about adopting blockchain. In addition, technology companies were also engaged which are working on developing blockchain-based solutions. The results showed that implementing a blockchain-based solution will increase transparency but decreases cost efficiency for emitters and offset developers while increasing it for hedge funds and technology companies. Also, no strong results were obtained about the increase or decrease of accessibility of ETS to more organizations and industries. A major drawback of blockchain-based ETS model was also observed. As blockchain removes the requirement of third parties, it creates risks to verification of credits which would result in loss of credibility of the trades in long run. Therefore, the findings imply that blockchain alone cannot be the solution to improve carbon markets.

Sustainability and Small and Medium-Sized Enterprises (SMEs): Exploring Sustainability-focused Business Network Best Practices for Facilitating Sustainability Adoption among Canadian SMEs

Ryan Nash

Small and medium sized enterprises (SMEs) make up a large portion of the Canadian economy, posing considerable impacts on social, environmental, and economic well-being of society. Sustainability-focused business networks (SFBNs) provide unique opportunities to stimulate sustainability adoption for SMEs across Canada. This paper sets out to identify best governance practices for SFBNs by analyzing ten SFBNs in densely populated Canadian urban centres. Networks that varied in terms of regional identities, network mandates, ownership and development structures, maturity, and size were sought after for study. A comprehensive literature review informed an analytical model of SFBN network governance types and their dynamics, achieved through an understanding of organizational level governance, network governance, and contextual variables. Semi-structured interviews of ten key informants from ten networks helped inform this analysis. Findings suggest that: (1) the strategic appointment of network board members; (2) the use of network development frameworks; (3) leveraging regional differences; (4) certain network membership requirements; and (5) harnessing external partnerships, can enhance network outcomes for SFBNs. Due to SFBNs' unique mandates, further research is required to study the implications of governance structures on network outcomes. A discussion on the need for adaptive and flexible governance instruments is included, calling for a change in the traditional view of network governance as static.

Understanding Sustainability and Brand Gender Identity in the Apparel Industry

Holly Nevison

The apparel industry has negative consequences on both the environment and the people that make our clothes. Companies are offering sustainable apparel to minimize negative environmental and social impacts of the industry. Introducing sustainable product may affect brand gender because sustainability is cognitively linked to femininity at the consumer level. Brand gender is an important cue for consumers to evaluate brands. It is important brands understand how sustainable product introductions may affect brand gender because brand gender affects brand equity. A consumer survey was used to test consumer evaluations of masculine and feminine brands before and after a sustainable product was introduced. Results show that both brand femininity and brand masculinity increased. Brand equity also increased, and was driven by change in brand femininity. Because both masculinity and femininity impressions increased, and both types of brands benefitted, sustainability may have both masculine and feminine attributes. Sustainable products may signal femininity in caring for the environment, and may signal masculinity through risk-taking behavior by facing environmental issues. Brands should highly masculine or feminine attributes of sustainable products to enhance its brand gender and in turn brand equity.

Going for Green: An Assessment of Environmental Sustainability at the Olympic Games

MacKenzie Paluck

The concept of environmental sustainability in the context of mega sporting events such as the Olympic Games has become an increasingly acknowledged priority by the International Olympic Committee (IOC) over the last two decades. This paper explores the environmental sustainability progress which has been made in the previous 10 Olympic Games, beginning with the 2000 Sydney Games where environmental sustainability was initially recognized by the IOC. The environmental goals of Sustainability Plans and pre-game bid reports for the Olympic Games are analyzed using a simplified weight summation methodology which assess them based on 6 specific environmental dimensions. The results show that the Olympic Games fail to show an improvement in environmental performance over the years, with Games continuously failing to accomplish their environmental goals or causing outright environmental harm. The results also illustrate a lack of consistency in the understanding and implementation of environmental sustainability by the host city Olympic Committees. Therefore, the findings of this study imply an immediate need for clear improvements to be implemented by the IOC to increase environmental sustainability management at the Olympic Games.

Are Social Enterprises an Effective Design for Waste Electrical and Electronic Equipment Management Systems for Sustainable Development in Ontario?

Joelle Pang

Social enterprises as a business model are proposed to address inefficient waste management systems for waste electrical and electronic equipment (WEEE). WEEE is the fastest growing global waste stream and social enterprises are a growing business model. There is little research on the intersection between these two topics. This research focuses on how WEEE social enterprises can address environmental, social and economic needs for sustainable regional development in Ontario. A sustainability systems approach is used to assess literature relating to waste management, WEEE, social enterprises, social economy and sustainable regional development. Key themes are identified from WEEE social enterprise case studies in Scotland, Australia, Canada and the United States of America. The key elements include not having a single model for success, remaining registered under the current business model even after newer legislations have created more options and a strong reliance on marginalized individuals which requires an extra level of care. These identified factors are applied to a Canadian context in the province of Ontario through policy recommendations. Future research on the impacts of new Ontario legislations and how lessons from Europe's circular economy action plan legislations can be applied to Ontario should be explored.

The Missing Piece: Understanding the Role the Canadian Airline Sector Plays in Sustainable Development

Michael Perryman

Airlines play an important role in sustainable development. They facilitate air travel, offer employment opportunities and provide clear socio-economic benefits. On the other hand, they generate a series of socially and environmentally adverse effects. At a time when the global community has come together to tackle some of the most pressing sustainability challenges, through the adoption of the Sustainable Development Goals (SDGs), it is important to understand the role that sectors such as aviation have in helping or hindering these overall achievements. This study aims to understand how the Canadian airline sector perceives their role in achieving the SDGs, as well as any challenges or successes they face implementing the SDGs as a guiding framework and in undertaking other sustainability actions. Through a series of semi-structured interviews, this research suggests that Canadian airlines perceive themselves as having an important role in advancing global sustainability due to their significant environmental and social impacts and unique capabilities of facilitating air travel. However, few Canadian airlines have committed to the SDGs as a guiding framework due to several factors including a general lack of awareness of the global agenda, a lack of requirement to do so, an unperceived benefit to the airline business, limited human and financial capital, as well as insufficient guidance & support in making these commitments. Guided by the interview responses, Canadian airlines expect support from the government in advancing the SDGs. Specifically, Canadian airlines demand support through loans for technological innovation and guidance in setting goals relevant to the airline industry. The SDGs are the perfect instrument to promote sustainable development within the industry because of the great degree of public awareness globally, as well as the plain language that communicates actions simply and effectively. These characteristics make the SDGs a beacon for Canadians to aggregate to in the pursuit of sustainable development. However, a greater degree of engagement with the airline sector will be critical to their success.

Compliance with the SASB Environmental Reporting Framework by Canadian Oil & Gas Companies – An Analysis of Materiality Reporting

Sarah Pupovac

This study illustrates the state of materiality disclosure and describes the factors that influence variation in compliance to the Sustainability Accounting Standards Board (SASB) environmental reporting framework for a sample of 7 Canadian E&P companies from 2016-2018. The study collected publicly disclosed sustainability reports and quantified the degree of compliance to the SASB environmental framework. Industry analysis, literature reviews, and regulatory scans were performed to qualitatively describe factors influencing variation. In the sample of 7 E&P companies, materiality disclosure has improved and had a positive momentum of 4% from 2016-2018. The average degree of compliance was highest for GHG Emissions and Air Quality and lowest for Biodiversity Impacts. Water Management Compliance had the largest momentum, or increase in reporting from 2016-2018. By analysing environmental and regulatory pressures in the Canadian economy, this study indicates gaps in disclosure, which are quantified as average compliance below 50% from 2016-2018. Gaps in disclosure occurred with respect to VOC emissions, qualitative management of GHG emissions, freshwater scarcity management, and quantitative biodiversity assessment. Gaps in material environmental disclosure present concerns to companies, investors, and securities regulators. The gaps identified in this study demonstrate the need for improved environmental disclosure requirements for Canadian oil and gas issuers.

Monkey See, Monkey Do: Institutional Isomorphism and Climate Action Planning in Canadian Universities and Municipalities

Manasvini Ramasubramanian

Increased attention to sustainability and climate change has instigated the development of climate change action plans at numerous institutions, including universities and cities. Existing research on climate action plans analyze plans between similar institutions, with no cross-comparison between institutions from different sectors. Through the lens of institutional isomorphism, this study aimed to determine whether Canadian university climate action plans are decoupled from those of their local municipal government. This was tested by using key target words from SDG 13 as a guiding framework to qualitatively analyze each of the climate action plans. The study found no evidence of such collaboration in the development of university action plans, despite their local municipalities having produced plans much before the universities. A disconnect between the planning efforts being undertaken by these two types of institutions can result in opportunities being missed as a result of this lack of synergy & coordination. Cross collaboration and consultation between universities and their cities can help both institutions prioritize the most imminent changes that are required in their relevant communities. For instance, universities might be better equipped at raising awareness & educating the community, while cities might be better equipped at aiding universities in their efforts to build institutional capacity through funding for retrofits, etc. Successful universities can showcase the benefits of the collaborative development of integrated climate action plans and could potentially have a domino effect on peer institutions as a result of isomorphism.

The State of Waste Generation from Road Running Races in Canada

Mitchel Selby

Road running events are responsible for generating large amounts of waste. This paper aims to calculate the total weight of waste generated at road running events in Canada annually. It also aims to determine the level of waste management action currently taken by race directors and the potential impact if more action is taken. Finally, it aims to understand the drivers and barriers for race directors to take waste management action. This paper uses primary data collection, a series of calculations, and interviews with race directors to achieve these objectives. It finds that waste generated from organized running events in Canada is significant, as these events produced an estimated total of 205,074kg of waste in 2019. It also notes that while 39% of all road running events are taking some level of action to manage this waste, the overall impact of these efforts is small, as it only resulted in an estimated 7% of all potential waste being reduced in 2019. This is primarily due to the fact that most events within this 39% only take a few actions each, many of which are not impactful but are easier or less expensive to implement. This presents an opportunity to achieve large reductions in waste at road running events going forward. This paper has estimated that up to 77% of all potential waste can be reduced annually if all road running events in Canada adopt impactful waste management actions. This paper determined the primary drivers of waste management action are having an internal sustainability champion, the presence of a financial incentive, and community expectations or mandates. This paper also determined the primary barriers of waste management action are negative impacts on event profitability, limited time available, and a perceived lack of participant interest in sustainability at races.

Considerations of the Carbon Footprint of Imported and Domestic Lettuce for Canadian Retailers

Katia Taillefer

This research aimed not only to guide procurement strategies for retailers in the GTA, as they shift their priorities to address their carbon footprint but also, help future life cycle assessments (LCA) for Canadian lettuce and potentially other produce. A partial LCA was used to measure the greenhouse gas emissions (GHG) emissions from the production of Canadian field- and greenhouse-grown lettuce, as well as the emissions associated with the import of American lettuce. The preliminary results demonstrate the CO₂ emissions associated with lettuce production in Canadian greenhouses are significantly higher than the other two sources, a total of 0.794 kg CO₂ eq-1. Domestic open-field lettuce assessment, the total CO₂ emissions for this source are 0.2 kg CO₂ eq-1 which is the source with the lowest CO₂ emissions. Retailers who aim to reduce their environmental impact should prioritize domestic open-field lettuce in their procurement strategy. The energy use in greenhouses (95%) and the transportation of imported lettuce (55%) had the highest emissions, therefore strategies to reduce emissions in the supply chain should focus on those the life cycle stages. This study confirmed that there are significant gaps in the data available regarding the GHG emissions from production practices, in greenhouse and open field farms, particularly for fuel used for agricultural machinery in Canada. It is recommended that future research expand the LCA scope to include greenhouse materials transport, seasonality of energy use and refrigeration during transportation.

Operation Sweep the Creek: An Assessment of Industrial Microplastic Contamination in an Urbanized Watershed in Ontario, Canada

Nicholas Sin On Tsui

The widespread contamination of microplastics mobilized attention from government, industry, and academic stakeholders, decades after early documentation in the 1970s. Sources of microplastic contamination are diverse, including textile fibers, macroplastic fragmentation, tire abrasion, and here, we highlight the release from industrial sources. Releasing microplastics into the environment demonstrates harmful effects for wildlife, desecrates the beauty of natural environments, and poses economic loss to the plastics industry. Over 50% of Canada's plastics are manufactured in Ontario, providing immense benefits for the local economy and making Ontario a hotspot for industrial microplastic contamination. There is also little traction to adopt clean operation practices provided by environmental management systems such as Operation Clean Sweep, a voluntary pledge for zero pellet loss, let alone regulations to control microplastics release into the environment. To assess local sources of microplastic contamination from the plastics industry, we used a 368µm mesh net to collect event-based samples across three wet and four dry weather events downstream of 18 identified plastic-based companies in the Mimico watershed. We collected a total of 890 microplastic particles, of which 146 were characterized as industrial microplastics. Although industrial microplastics were found ubiquitously across all samples, 83% were collected in the presence of rainfall. Under the pretense of Operation Sweep the Creek, we engaged with the 18 identified plastic-based facilities to share our findings with the local industry and educate on solutions to reduce their impact. One out of 18 facilities responded affirmatively, whereas others declined or ignored our initiative. Our study provides a baseline level of industrial microplastic contamination and preliminary behavioural insight of the local plastics industry in the highly urbanized Mimico Creek watershed. Although the current sustainability of the local plastics industry is low, we believe the industry's sustainability can be accelerated through policy, technological solutions, and successful collaborative efforts between academia, government, and industry.

The State in which Gender Impacts are Considered Among Environmental Impact Assessments

Morgan Turpin

Development rooted in resource extraction repeatedly creates disproportionately negative outcomes for female populations. A well-established body of literature has solidified that women are largely excluded from sharing in the benefits of mining, while simultaneously burdened with its adverse impacts. Environmental impact assessments can serve as a potentially vital mechanism in which concerns over the effects of a project on women and mitigation measures can be discussed and influence decision making. However, the use of environmental impact assessments for such purposes has yet to be appropriately utilized. There remains considerable variability in the extent to which gender is considered within socio economic impact assessments within Environmental Impact Assessments. This study aims to address the gap in knowledge through curating a better understanding of the extent to which effects of a resource extraction projects onto women are considered in Canada. This study considers how often and in which contexts gender and issues pertinent to women's wellbeing have been considered among publicly available, federal level EIAs for proposed mineral and mining projects completed as of February 2020. Reports were coded for direct as well as indirect mentions of the effects the project may impose onto women. The outright mention of women and gender were determined to be rare. Instead, the more nuanced ways in which effects on women may be accounted for generated the majority of data. The general conclusion remains that areas in which women experience impacts are currently being considered to some extent, what is missing is an intention behind these considerations. This intention being, a consideration of these effects with a direct and mentioned motivation to do so in an interest to drive better outcome outcomes for women during the assessment of developments rooted in resource extraction.

Building Community Resilience by Connecting Communities and Institutions

Rylan Urban

It is important for communities and institutions to utilize their respective capacities in complementary ways when working together to respond to disaster. This paper uses a community resilience lens to identify the conditions that bring communities and institutions together, and how relationships are built and strengthened between them. A systematic analysis of the literature was conducted to develop four generalized academic framings around community-institutional relationships. Lessons learned are used to make specific recommendations for how the Healthy and Resilient Cities Project can best inform resilience-building pilot projects in the City of Toronto. This research also identifies a gap in the literature around mediating structures and notable ambiguity around the term community-based organization. Our recommendations for clarity, along with a possible direction for future research, are discussed within.

The Appropriateness of Extended Producer Responsibility as a Policy Option to Manage Compostable Plastics in Ontario

Amanda Vrbensky

With concerns of plastic pollution continuing to grow in Canada and around the world, compostable plastics have been designed as an alternative to alleviate the end-of-life consequences of plastics. However, there are claims that compostable plastics are not breaking down sufficiently in organic processing facilities. This paper intends to examine policy options to manage compostable plastics in Ontario and focuses on extended producer responsibility. Extended producer responsibility (EPR) is a program that places financial and/or operational obligation for waste management on the producers of products and packaging. Through a literature review, jurisdictional scan, and stakeholder interviews, this paper examines the current challenges with compostable plastics and existing policy levers. The results show that there are disagreements among key stakeholders for how compostable plastics should be managed. Although stakeholders agree a certification standard is needed, participants did not agree on what level of government should be implementing the standard nor whether an existing standard is appropriate. There is also inconsistency on whether EPR is an appropriate policy option to manage the material. The jurisdictional scan showed that although some jurisdictions obligate EPR fees for compostable plastics, or mandate certifications and labelling requirements, no jurisdiction is ensuring compostable plastics are composted. This paper provides recommendations for how Ontario should move forward with regulating compostable plastics. The findings suggest that further collaboration among stakeholders in Ontario is needed to determine best practices. This research suggests that obligating compostable plastics as a material under EPR, but not mandating the collection and processing creates a fragmented and ineffective system. If producers are paying fees for the end-of-life management of the materials, then the material should be managed in the way it was intended.

Exploring the Application of Behavioural Strategies to Improve Multi-Residential's Waste Diversion

Yinan Zhang

In Canada, waste is a shared responsibility between Federal, Provincial and Municipal governments. As the trend for urban intensive, high-density living spaces increase, identifying best practices to establish long term pro-environmental behaviours such as recycling and composting are imperative to reach Ontario's over waste diversion goals of 80% by 2050. Multi-residential waste diversion is especially challenging when compared to single-family homes. Waste imposes a negative externality on the environment, furthermore, waste management practices generate delayed feedback on one's participation. Therefore, changing human behaviour is a central objective for policymakers and waste management alike. Behavioral economics could be explored to encourage pro-environmental behaviours in multi-residential tenants. In this research, four behavioural strategies were explored to identify its effectiveness on improving the multi-residential's waste diversion rate (System 1 and System 2 thinking, Social Norms nudge, Pre-commitment nudge and Monitor and control strategies). It was identified that overall, significant difference was observed in sorting accuracy between each waste bins (Garbage, Organics, and Recycling). In particular, respondents performed poorly in recycling and garbage sorting when compared to organics sorting. Source separation is a very difficult task; therefore, behavioural economics strategies could be used to further improve established waste management frameworks where individuals have a strong source identification knowledge and overall waste diversion awareness.

Overall, this research aims to develop an understanding of behavioral change models that can be used to increase waste diversion participation for those that are living in multi-residential units.