

## **Developing National Frameworks for Inclusive Sustainable Development Incorporating Lifestyle Factor Importance**

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### **Abstract**

Sustainable development is an important United Nations agenda, and the determination of which of the sustainable development goals (SDGs) should be prioritized is left up to each participating nation. Stakeholder engagement including all members of society can engender a nationally representative priority SDG set. This research investigates inclusive sustainable development which incorporates an approach to stakeholder engagement. The study assesses precedential scholarship of stakeholder engagement and sustainability evaluation, identifying a gap in terms of the inclusion of householder perceived importance of lifestyle related factors in sustainable development policy making and evaluation. Utilizing a case study of the aging, shrinking population of Japan, a representative, national survey of householders is undertaken, demonstrating that lifestyle relevant factors of sustainability approximate jurisdictionally important United Nations SDGs and help to identify priority targets within these goals. Perceived importance variety across household generations is also identified, providing guidance for policy makers in terms of age-relevant policy making and jurisdictionally important cultural factors. The framework proposed has applications in the case-study nation and is also readily applicable to other jurisdictions and for use in comparative studies.

**Keywords:** sustainable development, lifestyle, survey, perceived importance.

## **1. Introduction**

In order to support our lifestyles, we consume a number of resources, some of which are limited, and through our consumption, impact upon the environment. Although priorities vary from nation to nation, at the global level we are made aware of some top-level priorities which include protection of the environment and the preservation of limited resources, addressing climate change, economic growth, improving social equity and maintaining quality of life. These priorities fall under the agenda for sustainable development, incorporating 17 Sustainable Development Goals (SDGs; United Nations, 2018a).

With sustainable development as our ultimate goal, and the need for an inclusive approach to policy making, two key issues are raised as the motivation behind this research: 1) What are the necessary criteria to evaluate sustainable development from a lifestyle perspective? and, 2) How important are these criteria within the assessed jurisdiction(s)?

The SDGs are not legally binding, however the United Nations (UN) expects that governments will establish national frameworks for their achievement (United Nations, 2018b). As part of the development of a framework which can consider solutions to these critical issues within sustainable development, stakeholder engagement is likely to play a role in enabling a quantitative, nationally, socially and culturally appropriate evaluation mechanism. Not only will the relevance of indicators (including the SDGs) vary from nation to nation, so will their perceived importance and the identification of a national ideal.

Using a case study of the aging, shrinking population of Japan, the aim of this paper is to explore the perceived importance of lifestyle factors, establish appropriate weightings for future quantitative analysis, and to identify culturally important trends (extolled as missing pillars of sustainable development; Burford et al., 2013; Hawkes, 2001). This study proposes stakeholder engagement through a national survey, which can be adapted for use in multiple jurisdictions to provide singular or comparative assessments of lifestyle-conscious sustainable development in a quantitative and inclusive manner. The contribution of this work is in the detailing of the identified missing pillars of sustainable development through stakeholder engagement and their application to inclusive SDG framework design and complementary lifestyle-cognizant policy making.

This paper begins with a detailed literature review of concepts critical to our methodology and analysis of results in section 2. Section 3 details our methodology incorporating a national survey of Japan. Section 4 details the results of our survey and provides analysis of generational and cultural preferences within lifestyle factors. Section 5 discusses our results, specifically for the Japanese case study and generally in terms of applications toward policy making promoting sustainable development. We also outline replicability considerations and the limitations of our approach before detailing conclusions in section 6.

## **2. Background and Literature Review**

In establishing sustainable development and sustainability evaluations which are cognizant of social and lifestyle factors, previous scholarship has made strides toward integrating stakeholder engagement and perceived importance in a number of ways. For example, the linking of stakeholder engagement and sustainable development has been explored within the literature, ranging from the effect of end-consumer influence on corporate behavior in terms of climate change or environmental awareness. Haddock-Fraser and Tourelle identified that corporations which were close to their consumers were more likely to be active in climate change and management processes when compared to corporations further from customers (2010). Although there are not always cost-reduction benefits associated with these activities, it appears that reputation is an important business motivator as seen in Environment, Society, and Governance (ESG) and Global Reporting Initiatives (GRI) in recent years – suggesting that consumer choice plays an important role in environmental outcomes. Further, when considering differences between developed and developing nations, an empirical study showed that stakeholder influences is one factor behind corporate environmental responsibility practices and that market stakeholder influences are more pronounced in developed countries (Dogl and Behnam, 2015).

In terms of lifestyle factor importance on sustainability outcomes, precedential scholarship has identified the link between various environmental burdens resultant from lifestyles and household consumption due to its large influence (Ivanova et al., 2016). Dominant among these analyses is the consideration of household carbon footprints due to consumption, a proxy of our lifestyles (Zhang et al., 2015; Wiedenhofer et al., 2018). More detailed analysis of household environmental footprints based not only on consumption expenditure but also considering factors of householder age and income distribution have also been undertaken to establish the impacts of these factors on environmental footprints, utilizing an extended environmental input-output analysis approach (Chitnis et al., 2014; Wiedenhofer et al., 2017). In addition to these national level assessments, recent scholarship has identified the differences between younger and older households, and their differing use of energy and services. For example, it was identified that older people tend to consume more heat energy than their younger counterparts as they spend more time in their houses. For younger people, private vehicles, communications and information spending tends to be higher than for older people due to their prioritization of convenience (Kronenberg, 2009; Shigetomi, 2014). Further, the impact of household composition, geography and differing lifestyles on household footprints has also been explored (Jones and Kammen, 2014; Gill and Moeller, 2018) along with a consideration of the changing shape of society in terms of householder age and population trends toward the generation of public bads and societal burden (Chapman and Shigetomi, 2018). These studies each consider the lifestyle impact toward environmental burdens as well as the impact of specific factors upon their derivation. In line with the approach taken in this study, the “footprint family” proposes a combined analysis of more than one indicator in order to derive interdisciplinary, sustainable policy measures (Fang et al., 2014).

Often sustainable development and energy concerns go hand-in-hand, and stakeholder engagement in these matters is often contentious, as community stakeholders may oppose actions which they perceive as environmentally unfriendly, while seeking to balance low cost energy

provision and the conservation of the environment. A pertinent example is given by Epstein and Widener through the development of a sustainable development framework to inform energy policy in Wyoming and decision making about gas drilling and energy provision. Using a willingness to pay (WTP) framework, they discuss tradeoffs between the perceived importance of convenience and wildlife and environmental preservation (2011). When considering energy transitions, particularly from fossil fuels to renewable energy approaches, stakeholder engagement with energy policy experts was undertaken in Australia to determine a priority retirement schedule for black and brown coal fire power stations. This investigation of both policy priorities (as identified by experts) in order to determine critical sustainability criteria and to identify the co-benefits of climate change mitigation considering key stakeholder (local residents) social equity and energy justice outcomes and which indicators most significantly influence these outcomes, leading to policy development processes which better consider the gamut of stakeholder's socio-economic status (Chapman et al, 2018).

Urban planning, including public transport decision making can also incorporate stakeholder engagement, promoting the goals of economic development, sustainability and livable communities, as in the example of the USA where it is contended that the success of planning efforts relies on consensus between not only key project stakeholders but also the general public. Through a series of surveys, interviews and focus groups, benefits of access to passenger rail, such as increased tourism, retail, office and residential development were identified along with issues and obstacles such as convenience and competing funding priorities. Due to the inclusive nature of stakeholder engagement employed, it is expected that outcomes will provide guidance to transportation planners in the development of railway networks (Rangarajan, 2013). Another example of urban planning investigates the social equity impacts of mega-solar siting in Japan, detailing the interaction between local governments, private industry, landowners and residents through surveys and case studies (Fraser and Chapman, 2018). This study identifies that although local governments and their residents hope for improvements in amenity, social equity, and seek compensation the leverage available to communities with regard to mega-solar is significantly lower than that for centralized power plants of the past due to the abundance of cheap, suitable land for deployment.

The outcomes of such jurisdiction-specific investigations may be useful for ex ante sustainable development decision making. With regard to sustainable energy strategy development, the impacts of a participatory approach were explored through two case studies in Canada, demonstrating how stakeholder input and resultant policy recommendations are addressed by government (Adams et al., 2011). The stakeholder engagement approach included identification of stakeholders, including the energy utilities and the establishment of principle goals and objectives. This was followed up by the development and elaboration of scenarios and the interaction with stakeholders through formal dialogue and opinion surveys. The final outcomes, in terms of policy recommendations were fed back to stakeholders before ultimate submission as recommendations to government. The inclusion of a broad group of stakeholders is thought to improve the transparency of decision making, as well as improving the resilience and adaptability to future conditions (such as shifting political priorities) of energy policy.

In terms of generational approaches to stakeholder engagement and sustainability, Anderson et al. consider intergenerational equity using the approach of retrospective assessment to inform future stakeholder engagement (2012). By considering the bequests of the past, our response and considering the nature of our current stewardship in terms of sustainability stakeholders, it is proposed that we can begin to understand how future generations will judge the current generations decisions. Additionally, when considering a broad group of stakeholders and the evaluation or weighting of sustainability indicators, it has been highlighted that the information needs, priorities and expectations of each stakeholder group needs to be considered, in order that a common understanding of indicators and perceptions can be achieved (Mascarenhas et al., 2014).

Considering sustainable development and the SDGs from an international point of view, it is expected that developing and developed nations will undertake their own processes to establish policies for national development planning. In order to achieve fit-for-purpose national frameworks, a number of scenario modelling tools are available to nations aspiring to sustainable development. Allen et al. provide a review of 80 scenario modelling tools available toward this end, identifying a range of approaches including input-output, macro-econometric, computable general equilibrium (CGE), top-down, bottom up and hybrid approaches (2016). Within these approaches, they found that the majority of models (67%) employed address the sustainable development dimensions of the environment and economy, with only 19% addressing all three sustainability tenets of the economy, environment and society. Across the models investigated, coverage of SDGs varied, with only one example covering all 17 of the goals (Allen et al, 2016).

With regard to addressing SDGs comparatively, across nations, Xiao et al. take the approach of producer social risk and consumer social risk footprints – specific to the gender equality, mother and child health, governance and access to clean water goals (2017). They extol the virtues of using good quality available data and establishing frameworks which can ensure that SDGs are being met, while also suggesting that policies can be developed to encourage sharing of know-how and technologies from developed to developing nations, to assist in the achievement of SDGs.

In terms of the establishment of national frameworks for achievement of the SDGs, as conceptualized by the UN, the Organization for Economic Cooperation and Development (OECD) provides a review of OECD nations' distance to the SDG targets, identifying gaps in national approaches and future challenges toward 2030 (OECD, 2017). The report is cognizant of the fact that global priorities will be different, and not all SDGs will apply to each nation, and that countries may need to develop additional indicators specific to internal and trans-boundary impacts. Work has been undertaken to track individual nations' progress against a selection of sustainable development factors, for example in South Africa using a 'safe and just space' framework, to monitor and communicate a manageable set of environmental and social priorities and to prompt public debate to refine and improve such a framework (Cole et al., 2014). Additionally, Montenegro has taken a proactive stance toward monitoring and reporting on SDG indicators, using a consultative approach between experts and government ministries and the legislature. By assigning specific responsibility for SDG reporting to individual institutions, it is expected that by 2019 that Montenegro will be able to report against a majority of SDG indicators under their official adoption

of the National Strategy for Sustainable Development (NSSD 2030; Galli et al., 2018). Recognizing that a sound indicator framework can utilize the SDGs to enable management of sustainable development implementation strategies, Allen et al., investigated the conceptual framework and approach used in the Arab region (2017), incorporating 22 countries under the auspices of the Arab Sustainable Development Report (ASDR; UNESCWA, 2015). The selection of sustainable development indicators for the development of their framework was undertaken including consultation with experts and stakeholders to ensure regional applicability.

Considering the recent literature which combines stakeholder engagement with the achievement of sustainable development and the SDGs, we observe examples of consumer preferences impacts on business behavior, energy system and public transport planning, intergenerational concerns, single nation and comparative studies. From our analysis of the literature, we find that no comprehensive study exists which considers lifestyle factors cognizant of generational and cultural preferences, readily applicable to multiple nations.

This study builds on existing academic contributions, utilizing a national survey of Japan as a demonstrative case study, undertaken in March 2018, to identify the importance of broad lifestyle factors, specific sub factors, and also to test for the emergence of factors which have not been considered to date, or aspects which are culturally significant. As the literature suggests, there are many models for scenario building and SDG achievement evaluation, and the selection of an appropriate model or framework may be influenced by the nature of the jurisdiction to be assessed. Further, the preferences and perceived importance of factors by stakeholders will likely influence the selection of appropriate SDGs and the establishment of their priority.

**3. Methodology**

Our methodology is outlined using a case study in Japan and has three parts: 1) A survey to detail the perceived importance of lifestyle related factors of sustainability, 2) Analysis of survey results to determine generational preferences and identify cultural trends, and, 3) application of these outcomes to sustainable development related policies and evaluation processes (largely explored in the discussion section of this paper) including inter-jurisdiction replication. Figure 1 describes the methodology, analysis and potential applications of this research.



*Figure 1. Research Methodology Schematic*

### **3.1 Survey**

A national survey of 6,634 respondents was undertaken in March 2018 in Japan. The survey was conducted via the internet. Respondents were drawn from the 8 regions of Japan, covering all 47 prefectures. The sample is representative in terms of the number of respondents drawn from each region, balance of male and female respondents, distribution of ages and respondent incomes throughout Japan (summarized in Appendix A).

To frame the survey for the respondents, in terms of lifestyle choices and their impact on the environment, limited resources, distribution of burdens and sustainability, a guidance section prior to the questions was included, which read:

*“In order to sustain our convenient lifestyles, we need to use energy. Some examples of the direct use of energy in our lifestyles include gasoline, electricity, kerosene and gas. Most of the resources that we consume come from fossil fuel sources, and their consumption imparts a burden on the environment. Additionally, the mining and transport of resources, as well as the processes associated with the disposal of created goods also impact upon the environment. Bearing in mind the relationship between sustaining our lifestyles and environmental issues, please answer the following questions”*

The survey was designed to measure the importance of 6 general lifestyle factors including environmental protection, addressing climate change, preserving limited resources, healthy economy, convenient lifestyle and equitable society, each drawn from precedential research identified in the background and literature review sections. Within these 6 factors, 4 additional detailed sub factors were also measured for importance, giving a total of 30 (6 general and 24 specific) factors evaluated, detailed in the results section. Importance was measured using a 7-point Likert-type scale (with 1 used to express no importance, 4 neither important or unimportant, and 7 representing extreme importance).

In addition to the weighting of pre-defined factors in the survey, respondents were asked to assess the comprehensiveness of factors offered, and to identify any additional factors which were important to them and relevant to their lifestyle.

### **3.2 Factor Analysis**

Additional analysis is then undertaken using cross tabulation to identify the generational trends in terms of importance of lifestyle factors and to identify any differences between generational priorities of households in their 20's, 30's 40's, 50's and 60's and above. These trends are analyzed for each of the main and sub-factors in the survey. Further, the additional lifestyle factors identified through our evaluation are summed and grouped according to priority. Duplicates are cleansed from the sample and factors which may be quantified and those which are qualitative (generally topical or cultural factors) are discussed in the Japanese context.

#### 4. Results

First, the responses to the survey are tabulated, and average importance levels reported by all respondents for each of the general and sub-factors are detailed, as shown in Table 1.

*Table 1. Average Importance Scores for General Lifestyle and Detailed Sub Factors (n=6,634).*

General Factors	Importance	Sub Factors	Importance
Environmental Protection	5.54	Reducing GHG	5.41
		Reducing PM <sub>2.5</sub>	5.64
		Reducing Waste	5.63
		Reducing Industrial Pollution	5.80
Addressing Climate Change	5.20	Controlling Temperature Rise	5.50
		Maintaining Food Production	5.80
		Sea-rise/Desertification Control	5.58
		Controlling the Increase of Wild Weather and Natural Disasters	5.64
Preserving Limited Resources	5.52	Water Resources	6.18
		Fossil Fuels	5.41
		Rare Metals/Rare Earths	5.02
		Land Resources	5.43
Healthy Economy	5.54	Social Security	5.99
		Employment	5.77
		GDP Growth and Positive Trade Balance	5.10
		Increased Income	5.40
Convenient Lifestyle	4.58	Modern Communications (WiFi, SNS etc.)	5.01
		Private Transport	4.58
		Public Transport	5.31
		Physical Environment (shopping, leisure, public services etc.)	5.41
Equitable Society	5.51	Equitable Participation (Freedom of Expression)	5.29
		Reduction of Income Disparity	5.11
		Equitable Opportunity (Education, Employment, Work-Life Balance etc.)	5.37
		Equitable Tax Burden for Public Expenditure	5.32

When considering all respondent's preferences, environmental protection and a healthy economy (5.54) are considered the most important of the general factors, followed closely by preserving limited resources (5.52) and an equitable society (5.51). There is negligible difference between the top four responses, which are followed by addressing climate change (5.20) and the lowest scoring response of a convenient lifestyle (4.58).

Assessing the sub factor responses, reducing industrial pollution is considered most important for environmental protection, while maintaining food production is most important in terms of addressing climate change. Water is considered the most important among limited resources and social security the most important aspect within a healthy economy. In terms of a convenient lifestyle, shopping leisure and public services are paramount, while equitable opportunity in terms of education, employment and work life balance is given the highest priority in an equitable society.



Next, the generational impact upon lifestyle factors is investigated, using cross tabulation analysis, the importance of the general and sub-factors is assessed for each age group, with results shown in Figure 2.

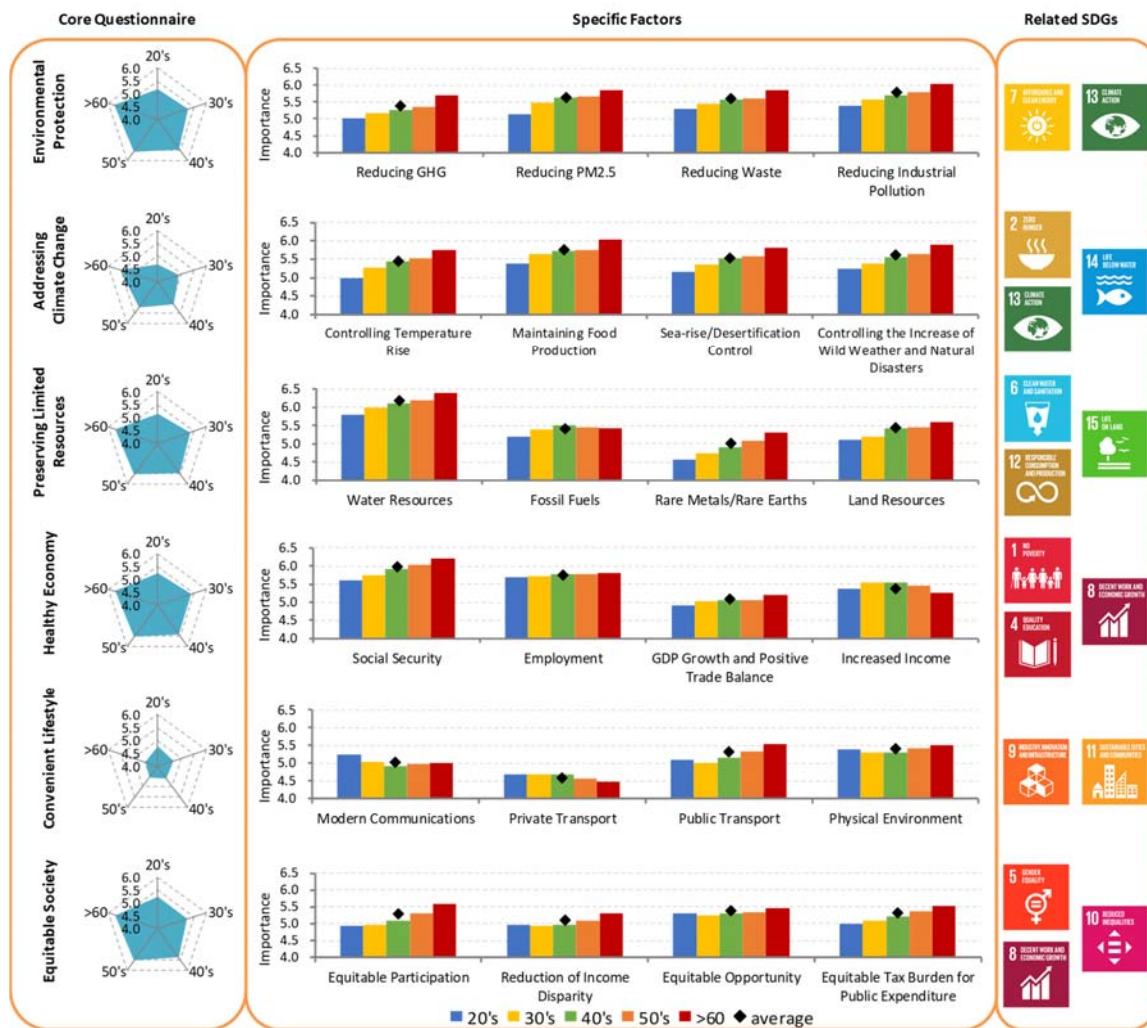


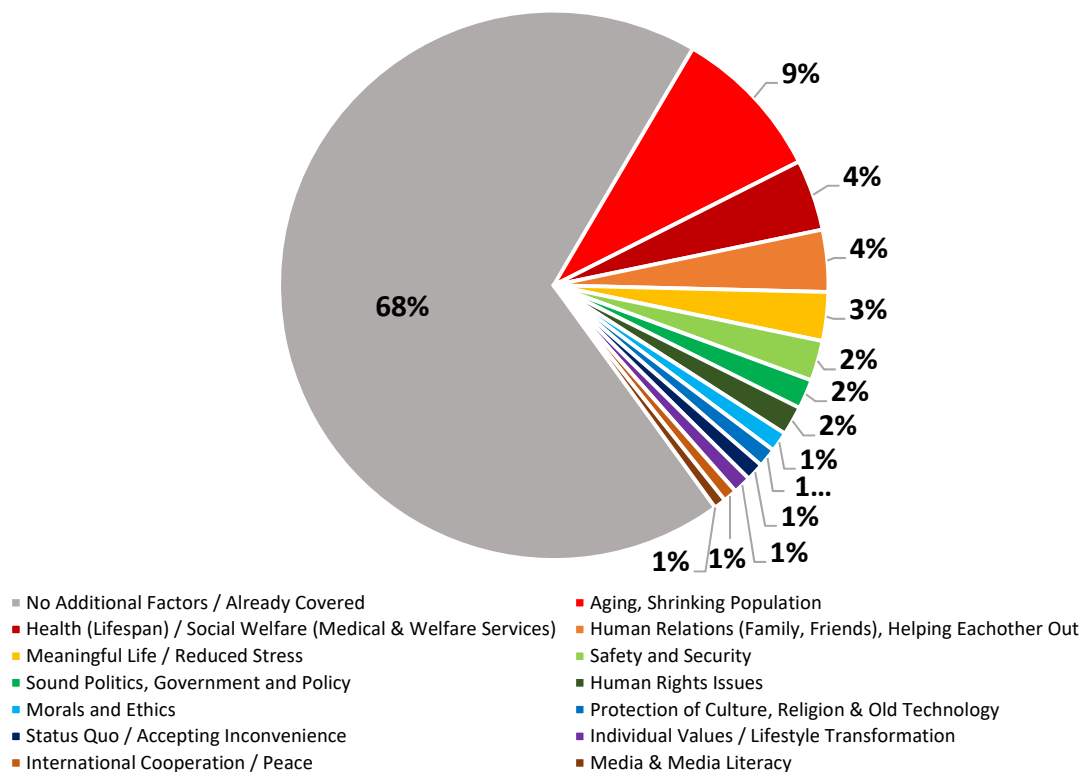
Figure 2. Lifestyle Factor Importance by Generation and SDG Overlap (n=6,634)

In almost all cases, on average, older households place greater importance on each of the factors explored. This trend is reversed only for convenient lifestyle, modern communications and private transport where younger generations express a higher level of importance. Employment is considered relatively evenly across the generations, as is the physical environment and equitable opportunity. Figure 2 also demonstrates where the lifestyle factors tested in our survey share aspects with 14 out of 17 established SDGs.

In addition to weighting and generational importance of factors as described above, respondents were asked to identify their opinion on the comprehensiveness of lifestyle related factors supplied,

and to identify any other factors or issues which were important to their lifestyle. A total of 6,890 responses were received, with some respondents providing multiple responses.

Approximately 68% of respondents identified the existing factors as comprehensive or reported factors which had already been investigated within the survey, confirming their importance. Responses were grouped into the categories as shown in Figure 3.



**Figure 3. Responses to Additional Important or Lifestyle Relevant Factors (6,890 responses)**

After no additional factors and factors already covered – an aging, shrinking population was selected as the most important lifestyle relevant factor, accounting for approximately 9% of all responses. This was followed by health and social welfare comprehensiveness and human relations and helping each other out (each representing approximately 4% of all responses received). A meaningful life and reduced stress accounted for 3%, while sound politics, government and policy, safety and security and human rights issues accounted for 2% each.

## **5. Discussion**

Our investigation of the importance of lifestyle factors employed a survey, aiming to inform stakeholder engagement to underpin the development of a national framework to evaluate sustainable development goals and aid in the development of national policy.

A survey is a very useful tool for developing lifestyle cognizant policies as it can 1) identify whether policy maker's preconceptions of 'important issues' match with stakeholder's ideals, 2) clarify the importance of each lifestyle relevant sustainable development factor, essential for matching outcomes with expectations, and, 3) uncover any specific cultural factors of importance, unique to the region being investigated.

Below, we discuss the outcomes of our Japanese case study, detail applications for sustainable development and describe how our approach may be replicated in other jurisdictions while clarifying the limitations of such an approach.

### **5.1 Japanese Case Study**

The results of the survey identify that the four factors of environmental protection, preserving limited resources, a healthy economy and an equitable society were most important to respondents. These four general factors scored between 5.51 and 5.54 points out of a maximum 7. Addressing climate change was considered slightly less important with a score of 5.20, and a convenient lifestyle was given the lowest priority of all, scoring only 4.58 points, slightly below the 'somewhat important' indicator. For the 5 most important general indicators, older households gave higher scores in all cases, while for the least important factor of convenient lifestyle, younger households gave the highest score. This trend indicates that in general, older households place a higher priority on the environment, climate change issues, resource management, the economy and social equity, while younger households place a higher priority on convenience. This may indicate that younger generations are more individualistic, while older generations are concerned about society more broadly.

Looking within the general indicators to identify important sub-factors we find that for environmental protection, reducing industrial pollution is the number one priority. In terms of addressing climate change, maintaining food production is most important. When considering the preservation of limited resources, water resources are considered significantly more important than any other. With regard to the economy, social security is premier among household's concerns. Convenience is underpinned by the physical environment which can provide basic services such as shopping and leisure, and also by the existence of stable public transport. Finally, for an equitable society, education and employment opportunities along with work life balance are considered most important, followed closely by the enforcement of an equitable tax burden for public expenditures. Again, each of these priority sub-factors were supported strongest by older households, except for the physical environment and equitable opportunity which showed mixed results across generations. Figure 4 details the essential factors for Japanese households within each general indicator and the related SDGs considered a priority within Japan.

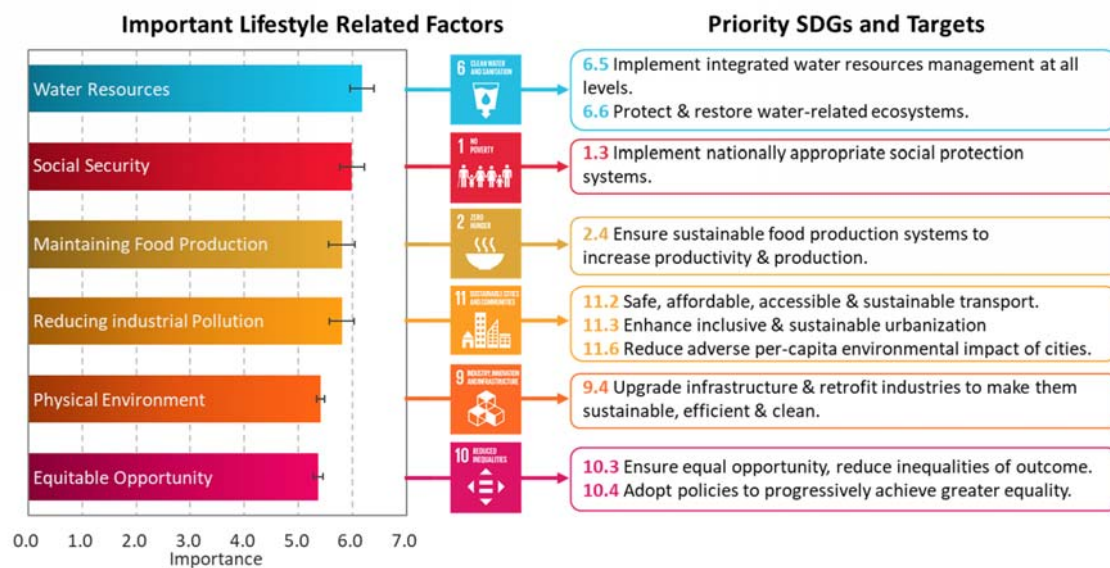


Figure 4. Essential Lifestyle Related Factors (Std. Dev. shown), Priority SDGs and Targets in Japan

It is not surprising that social security is of primary concern within the economy, nor that it is most strongly supported by older households. Japan has an aging, shrinking population, and the issues of post-retirement pensions, and sufficient, well-funded health services are recurring themes in the media and within academia (Sakamoto, 2009; Kazawa et al., 2017; Shigetomi et al., 2018). The cultural concern for ongoing issues related to an aging, shrinking population were again reinforced, based on the opinions provided by respondents to our survey. Those concerned with an aging, shrinking population and the issue of health and social welfare (including a healthy lifespan, and the provision of health and welfare services accounted for over 42% of additional lifestyle factor responses.

It follows then that public transport and the provision of robust public services are also a priority of the elderly. Maintaining food production appearing as a priority within climate change is also reflective of the situation in Japan whereby the calorie base is not being met by indigenous crops, and imports are heavily relied upon (O'Shea, 2017).

Although it is somewhat surprising that reducing industrial pollution is considered more important than the reduction of greenhouse gas (GHG) and particulate matter (i.e. PM<sub>2.5</sub>), this result may be reflective of education and recent domestic news in Japan. The tragedy of public disruptions caused by industrial pollution during the 1950-70s' in Japan (i.e. Minamata disease) for example, have been particularly pronounced within Japanese environmental education. In addition, the current controversy of relocating the largest fish market in Japan was sensationally broadcast, detailing industrial waste and site cleanup concerns (The Guardian, 2016). Further, locating disposal sites for industrial waste is often opposed by nearby residents (the NIMBY issue; Ishimura and Takeuchi, 2017), implying that waste is representative of a more visible environmental issue than that of climate change. This may have contributed to the higher reported importance in our survey.

Within our survey, water resources were considered the most indispensable for sustaining of lifestyle, even though the Japanese water supply is self-sufficient as opposed to fossil fuels, scarce and minor metals and land availability. This is perhaps because water is the most fundamental and visible resource in our daily life. In addition, it may be easy for people to imagine or experience an occurrence of water supply disruption, due to natural disasters such as earthquakes, particularly in light of the recent Great East Japan earthquake, where 2.3 million household's water supply was disrupted for extended periods (Tanaka, 2016). This finding implies that the visibility of issues may play an important role in householders' awareness of resource criticality.

Within the issue of an equitable society, the reduction of income disparity was rated as the least important of the sub factors, in spite of the existence of higher than average OECD income inequality in Japan (OECD, 2018). This result may be an artifact of the internet survey approach, which is known to favor higher income, higher educational achievement households with internet access (Pew Research Center, 2015).

Building on the theme of individualism, as identified within the convenient lifestyle general factor; modern communications (mobile phones, tablets, personal computers, high-speed internet, wireless internet and social networks) and private transport (i.e. owning a car) were all supported most strongly by younger households. Apart from those factors already discussed, a relatively constant level of importance across household generations was demonstrated toward employment and the preservation of fossil fuels, indicating that these issues carry a similar level of importance across the general population.

Contrasting the overall results of our Japanese case study, where some 14 of the 17 SDGs were identified as important for Japan (see Figure 2), and the specific, important factor identification as shown in Figure 4, we can narrow down the number of 'priority' SDGs to 6. In addition, by relating these SDGs to the important factors identified by respondents we can identify specific priority targets within each SDG. By narrowing down critical issues in this manner, we can assist the policy maker in the development of targeted policy to address policy issues of greatest importance to the population.

Based on the response to the final question regarding the comprehensiveness of lifestyle-relevant factors evaluated, and the necessity for additional factors, the majority of respondents identified that no additional factors were required or responded with factors (or synonyms of factors) already evaluated within the survey. Within this group, of respondents, 68% indicated no additional factors were required (a variety of responses were received, including: none, no additional factors required, nothing in particular, I don't know, I can't think of any more, etc.). Those who provided identical or synonymous factors to those already asked (perhaps confirming their importance) represented 20.2% of the 6,890-response sample, and included concepts such as work life balance, a fair and equitable society, protecting the environment, economic growth and food security, among others.

As mentioned above, issues which emerge as a result of an aging shrinking population were paramount (including health and lifespan and social welfare), however, some new issues were raised from within our cohort, including human relations (including family and friends, and helping

one another out; 11.5% of additional factor responses), a meaningful life and reduced stress (9.1%), safety and security (7.5%), sound politics, government and policy (5.5%) and human rights issues (5.4%).

In explaining the tendency for older generations greater concern for lifestyle factors (except for individually focused ones), this may be indicative of a greater concern for intergenerational equity (suggested to be able to assist in the prevention of climate change; Treves et al., 2018). Our results show that older people are generally more concerned about all factors investigated, whereas younger generation's responses seem to indicate that they are more concerned with some lifestyle convenience factors. Even though this trend is shown, overall, a convenient lifestyle is considered the least important of all factors, suggesting that perhaps people in our sample are happy to make some short-term sacrifices in order to have a more sustainable, environmentally aware lifestyle. This assumption is partially supported by a small group of respondents who identified 'maintaining the status-quo and accepting some inconvenience' as an additional factor for consideration (approximately 3.4% of additional factor responses).

## **5.2 Applicability to Sustainable Development**

Building on the findings of the literature review, extant scholarship has identified the importance of stakeholder engagement and sustainable development in a number of fields, including environmentally aware consumer and business behavior, the energy system, public transport planning and policy development. The literature is cognizant of intergenerational concerns, the types of SDGs which are, and which should be investigated for both single nation and international, comparative studies. There is an identified need to undertake stakeholder engagement when seeking to understand critical sustainable development factors, however there is as yet no lifestyle focused study which incorporates perceived importance, generational differences and cultural aspects of sustainable development. This study bridges this gap and demonstrates how such an investigation (in this case a nationally representative survey) yields results which can be applied to sustainable development-sensitive policy development.

Our results are encouraging; based on an analysis of our survey factors, when compared with the full range of SDGs, there is some overlap between at least 14 out of 17 goals, prominent among them the aspects of climate action and decent work and economic growth (represented in more than one core factor investigated in the survey). This suggests that a survey which investigates sustainability, cognizant of lifestyle may be a good approximator of key SDGs within a jurisdiction. In addition, by analyzing the specific factors within our core questionnaire, we could demonstrate the existence of issues considered most important within Japan and highlight 6 priority SDGs to be targeted for remediation through policy. These included clean water and sanitation, no poverty, zero hunger, climate action, sustainable cities and communities and reduced inequalities, in order of perceived importance. Within each of these SDGs we then describe the specific targets which relate most closely to our survey response. This level of detail is important in identifying national priority targets within the SDGs, as a broad target such as 'zero hunger' does not resonate well with the Japanese situation, however ensuring the increased productivity of agriculture in a sustainable

manner (target 2.4 within the zero hunger SDG) is especially relevant to Japan where a large portion of foods are imported.

Allowing for a follow up question seeking additional factors also proved fruitful, with respondents' identifying an aging, shrinking population as their primary concern, followed closely by health and social welfare and a significant portion of respondents showing concern for reduced stress and a meaningful life. These concerns generally fall under SDG 3: Good health and well-being. Likewise, the responses safety and security, sound politics government and policy, human rights issues, morals and ethics, and peace and international cooperation are reflective of SDG 16: Peace, justice and strong institutions, and to a lesser degree SDG 17: Partnerships for the goals. SDG 17 however, may be better served through the replication of this survey in other jurisdictions to identify potential areas for cooperation between nations with common interests and goals.

### **5.3 Limitations, Replicability**

Our survey and analysis, while able to identify perceived importance of lifestyle factors across generations, as well as linking these outcomes with sustainable development and the SDGs has some limitations. Firstly, as the survey is undertaken on the internet, approximately 6.7% of the Japanese population who are non-internet users are excluded (World Bank, 2015). Secondly, as discussed above, internet surveys tend to generate some bias toward households with a higher income and higher educational backgrounds (Pew Research Center, 2015). Finally, the survey results presented in this study are representative of a 'snapshot', and ongoing longitudinal studies are suggested to test for trends in results, and to see how generation results are affected, perhaps at 10-year intervals. Also, any study which seeks to compare two nations should ensure that survey activities are conducted within the same time period.

### **6. Conclusion**

This research sought to explore the perceived importance of sustainable development related lifestyle factors in order to identify cultural and generation preferences and to determine nationally important SDGs using stakeholder engagement in the form of a national survey.

This study has identified a gap in the existing literature regarding stakeholder engagement and sustainable development, as the consideration of lifestyle factors and their perceived importance to identify and measure sustainable development in a culturally sensitive manner. Indeed, by considering householders, their consumption and lifestyle choices, we identified the range of factors which are important to sustainable development, their importance, and variation across generations. By considering stakeholder input at the beginning of the policy development process, we can identify important sustainable development policy issues, and influence bottom-up policy making which is culturally and generationally sensitive.

Additionally, our methodology which utilized a household survey and analysis of lifestyle preferences enabled a reliable approximation of the jurisdictionally important SDGs relevant to sustainable development policy making at the national level. Based on the results of our Japanese case study, the identification of priority SDGs and specific policy targets for priority remediation was

also achieved. Further, the visualization of lifestyle issues and preferences, and the different levels of perceived importance between household generations provides lessons for policy makers as to generationally relevant policy issues, and appropriate policy intervention and evaluation.

The importance weightings identified in this survey can be applied to future quantitative analysis of sustainable development issues, either in single nation studies, or, through a replication of the survey and analysis methodology offered here, a multi-nation comparative study, cognizant of cultural variation.

Future work, building on the outcomes of this study could include the assessment of cultural sustainable development indicator and SDG importance variation between nations, and specific policy issue investigation, including but not limited to intergenerational sustainability, lifestyle impacts on social equity, generationally sensitive policy making, and quantifying the sustainability impacts of bottom-up policy development and implementation.



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## Appendices

### Appendix A. Survey Sample and Representativeness (n=6634).

	Criteria	Sample	Japan	Reference
<b>Region</b>	Hokkaido	4.4%	4.2%	Population Census of Japan 2015 (Ministry of Internal Affairs and Communications, 2017)
	Tohoku	7.2%	7.1%	
	Kanto	33.9%	33.8%	
	Chubu	18.2%	18.3%	
	Kinki	16.2%	16.3%	
	Chugoku	6.1%	5.9%	
	Shikoku	2.8%	3.0%	
	Kyushu	11.2%	11.4%	
<b>Gender</b>	Male	48%	48.7%	Population Census of Japan 2010 (Ministry of Internal Affairs and Communications, 2010)
	Female	52%	51.3%	
<b>Age</b>	20-29	12%	11.9%	Japan Statistical Yearbook 2018 (Ministry of Internal Affairs and Communications, 2018)
	30-39	15.1%	15%	
	40-49	17.7%	17.7%	
	50-59	14.9%	14.9%	
	> 60	40.4%	40.4%	
<b>Income</b>	< 2 Million Yen	7.6%	20%	Comprehensive Survey of Living Conditions (Ministry of Health Labor and Welfare, 2015)
	2-4 Million Yen	24.1%	27.1%	
	4-6 Million Yen	21.8%	18.6%	
	6-8 Million Yen	12.7%	13.6%	
	8-10 Million Yen	7.1%	8.6%	
	10-12 Million Yen	3.5%	9.1%	
	12-15 Million Yen	2.0%		
	15-20 Million Yen	0.9%	2.1%	
	> 20 Million Yen	0.6%	1%	
	No Response / Unknown	19.7%	-	