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Role of Automobile Industry in Climate Change Management: A Case Study on Maruti Suzuki Company

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Abstract:

Automobile industry is the industry which involved in the production of motor vehicles, The industry's main products are passenger automobiles and light trucks, including pickups, vans, and sports vehicles.

Commercial vehicles such as delivery trucks and large transport trucks, though important to the industry, are secondary. The most significant impact of the automotive aftermarket on the climate results from the construction, maintenance and use of facilities. Due to the nature of the business, the facilities are high and many of their functions energy-intense. Climate change management approaches are mitigation efforts to reduce greenhouse gas emissions; adaptation techniques to increasing society's capacity to cope with changes in climate engineering additional, geo engineering deliberate manipulation of the earth system. in this paper we discuss about maruti company measures for climate change

Key words: ***Automobile industry,climate change managment,geo engineering***

Preface:

Automobile industry is the industry which involved in the production of motor vehicles, The industry's main products are passenger automobiles and light trucks, including pickups, vans, and sports vehicles. Commercial vehicles such as delivery trucks and large transport trucks, though important to the industry, are secondary. The most significant impact of the automotive aftermarket on the climate results from the construction, maintenance and use of facilitiesClimate change management approaches are mitigation efforts to reduce greenhouse gas emissions; adaptation techniques to increasing society's capacity to cope with changes in climate engineering additional, geo engineering deliberate manipulation of the earth system. By minimizing emissions, mitigation decreases society's future contributions to greenhouse gas quantities in the environment. Ultimately, this could help in reducing the amount that climate can change and therefore increase the potential that societal impacts will remain acceptable. Approaches to reducing emissions fall under several classifications.

These include 1) regulation; 2) research, development, and deployment of new technologies; 3) conservation; 4) efforts to increase public awareness; 5) positive incentives to encourage choices that lower emissions; and 6) adding a price to greenhouse gas emissions, which creates incentives to reduce emissions broadly. Adding a price to greenhouse gases is a particularly essential policy decision because it will be expected to have a high impact on emissions; it has received a good deal of attention from the research community; and it could have been a focus of policy discussion.Adaptation involves planning for climate changes, building resistance to those impacts, and improving society's capacity to respond and recover.

This could certainly help reduce damages and interruptions associated with climate change. Adaptation policy include regulation to decrease vulnerability (e.g., through land-use planning and maintaining building codes); response planning; disaster managment; impact assessment for critical systems and resources (e.g., water, health, biological

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systems, agriculture, and infrastructure); observations and monitoring; and efforts to minimize compounding stresses including traditional air pollution, habitat loss and degradation.

Geoengineering would potentially help lower greenhouse gas quantities in the environment, neutralize the warming impact of increasing greenhouse gas concentrations, address particular climate change impacts, or allow desperation techniques in the event that abrupt, catastrophic, or otherwise unacceptable climate change impacts become evident. Geoengineering would also create new sources of risk because attempts to engineer the environment system on a significant scale could lead to unintended and adverse consequences.

Review of Literature:

Maddison, D. 2001. In search of warmer climates? The impacts of climate change on flows of British tourist. Climate Change , Vol. 49, pp. 193-208.The main objective of this paper is to suggest an approach to measure the welfare impact of changes in the climate of holiday destinations on tourists and also to predict changes in the number of trips to particular holiday destinations caused by climate change. A theoretical model is used for this purpose. The model reveals how well-informed individuals allocate their time and money between visiting different holiday destinations and the consumption of other goods; in order to measure the welfare impact of changes in climate the author invokes the concept of 'weak complementarity'.

Weak complementarity describes a situation in which it is possible to hypothesize the price of a particular commodity being so high or so low that marginal changes in the level of a non-marketed environmental amenity cease to matter. This paper investigates the impact of climate change on the chosen destinations of British tourists. Destinations are characterised in terms of 'attractors' including climate variables, travel, and accommodation costs.These variables are used to explain the current observed pattern of overseas travel in terms of a model based upon the idea of utility maximisation. For the dependent variable quarterly data on international travel (i.e., the number of return trips) by British residents is taken from the International Passenger Survey (IPS) for 1994. The data set also contains the average return fare (by air or by sea) paid per person to each destination, average spending on items other than fares and the average duration of the stay.. Martin, M.B.G. 2005. Weather, climate a nd Tourism a geographical perspective. Annals of Tourism Research , Vol. 32, pp. 571-591.This article highlights the close relationship be tween climate, weather and tourism, and shows the need to understand the nature of these relationships, in order to show how tourism planning might be more effective. Further, the article as serts that tourism planning should incorporate more than simple, general descriptions of the climate, which are often unconnected to the needs of tourism. The author suggested that various agents playing roles in tourism must be made aware of the need to incorporate aspects of climate and weather into the design and development of their various projects. The author explains nine factors on the implication of weather, climate and tourism for tourism planning. Specifically, the paper considers the influence that climate and weather exert on the geographical space, demand, supply, and market agents of the tourism system. The paper also emphasized the need to improve the networks of meteorological observatories and better access to the information. Matzarakis, A. 2006. Weather- and climate-related information for tourism. Tourism and Hospitality Planning & Development, Vol. 3, pp. 99-115.The aim of this paper is twofold.

One is to describe in a useful and understandable way how weather and climate can affect the making of decisions about a vacation area and how to access existing information. The second aim is to show what kind of weather/climate information exists and which information is relevant for tourists and the tourism industry. The methodology used for the paper is applied climatology and the human biometeorology to

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address the issues in climate and tourism. The sources of meteorological and climatological data include national weather services,private weather services, environmental agencies and governmental authorities running their own measurement networks. Also some of the data came from tourism guidebooks and the Internet. The paper suggested that climate information needs to be quantified and should be provided to the tourism planning and tourism industry using mean values, extremes, frequencies and probabilities.The paper also emphasized that climate information is important from the human-biometeorology point of view especially the thermal component of climate index for tourism. The paper also cautions that emission scenarios in tourism destinations will suffer from bioclimatic change conditions and this will have a significant impact on local economies in the near future. Meze-Hausken, E. 2007. Seasons in the sun - weather and climate front-page news stories in Europe's rainiest city, Bergen, Norway. Int J Biometeorology , Vol. 52, pp. 17–31.This paper explores aspects of weather and climate dealt with in print media over a period of 10 years. Two research issues are discussed in the paper. The first one investigates the diversity of contexts in which weather and climate information is taken up in a newspaper's front-page story. This serves as a background for the second issue which tries to uncover the cliché of good and bad weather by comparing weather descriptions in the news with factual meteorological data. The paper hypothesized that defining a day as good is a matter of supply and demand, suggesting that during seasons with generally much rainfall and darkness, even a day with relatively little sunshine, gives the impression of a good or beautiful day. The case study for this paper focuses on print media in Europe's rainiest city, Bergen, Norway. Material for this paper was collected from 10 years of frontpage articles of the daily newspaper Bergens Tidende, spanning 1994–2003.

The findings suggest that many articles clearly had components from several cat egories, even if the primary weather message was the coding rule. An analysis of Bergens Tidende has shown that climate and weather issues tend to dominate front pages throughout much of the year , truncating the normal range of news topics, although some seasonality is present. Some stories on anomalous climate seasons or weather disasters lead to engaged debates over causes, impacts, and mitigation for the future, while others provide an event-description with some connotation of the weather during that event. Scientific knowledge on topics like climate change or El Niño is presented in a way which the audience comprehends without deeper knowledge of the subject, and is aimed to place local happenings in a wider time and geographical perspective. This study investigated how society represented through journalists and news in print media, value, think, and perceive weather events and climatic conditions. 3.21.

Morgan, R., E. Gatell, R. Junyent, A. Mica llef, E. Özhan, and A.T. Williams. 2000. An improved user-based beach climate index. Journal of Coastal Conservation . Vol. 6, pp. 41-50. This study was based on responses of North European beach users at sites in the UK and various Mediterranean locations. Investigation of this issue together with associated publicity might help to spread the tourism load and hence reduce undesirable social and environmental effects of extreme seasonality in tourist demand.

Questionnaire surveys were carried out in Wales, Malta and Turkey to establish the preferences of north European beach users for thermal sensation and bathing water temperature, plus priority levels for other climatic attributes. In total, more than 1600 beach users were interviewed during the ummers of 1994 and 1995. The questionnaire survey included an investigation into the preferences of beach users for the climatic aspects of thermal sensation and bathing water temperature. It also aimed to assess the relative priority levels given to these two aspects plus sunshine, absence of rain, and windiness at the beach location. Results showed that excessively hot thermal sensation occurs in many southern and eastern

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Mediterranean coastal destinations during July and August, the present peak of the beach tourism season.

The climate index devised showed that many southern and eastern Mediterranean tourist destinations can become unpleasantly hot even for sedentary beach us e during July and August. This is the peak of the summer season in terms of visitor numbers for many such destinations, when infrastructure components such as accommodation, transport (both local and international), sewage and water supply are often strained to their limit. 3.22. Nastos, P.T. and A. Matzarakis. 2006. Weather impacts on respiratory infections in Athens, Greece. Int J Biometeorol , Vol. 50, pp. 58–369. The paper focuses on the contribution of meteorological parameters to the total variability of respiratory infections. For this reason, data on the daily numbers of general practitioner consultations for respiratory infections during the year 2002 were used. This came from the Local Health Service in the surroundings of Athens. The meteorological data obtained by the Meteorological Station of the National Observatory of Athens comprise daily values of mean,maximum, and minimum air temperature, air temperature range, relative humidity, absolute humidity, sunshine, surface atmospheric pressure, wind speed, as well as day-to-day changes of these parameters. In addition, biometeorological parameters and thermal indices such as mean radiant temperature, predicted mean vote, physiologically equivalent temperature and standard effective temperature as well as their day-to-day changes are us ed in the study. The relationship between every meteorological-biometeorological parameter and consultations for respiratory infections was examined by applying the Pearson Chi-Square Test. The study also applied generalized linear models. The results of the analysis show that the thermal index predicted mean vote is strongly associated with respiratory infections. 3.23. Page, S. J. 2009. Current issue in tourism: The evolution of travel medicine research: A new research agenda for tourism? Tourism Management, Vol. 30, pp. 149-157. In contrast to existent body of knowledge, Pages addresses the issues associated with tourist holiday-taking and its management by the tourism industry seeking to broadly outline the evolution of this area of study and some of the influential studies published to date along with some of the research agendas now emerging in this new area of study.

His research summarizes the social science intersection of tourism studies from individual concerns with travel. The paper discussed issues of tourist well-being, trends affecting tourist risk and in jury, and the steps the tourism industry is taking to minimize the risk and incidence of injury. The paper emphasized a limited and managed interaction with natural environment and local population which provide positive tourist experiences of both place and wider holiday by minimizing risk situations. In the conclusion the author noted that government and public sectors have responsibilities to ensure that all tourism providers dutifully take care of their guests and visitors. In this regards the author suggested “Best Practice” measures for government agencies. Parrilla, J.C., A.R. Font, and J. R. Nadal. 2007.

Accommodation determinants of seasonal patterns. Annals of Tourism Research , Vol. 34, pp. 422–436. According to earlier discussed works, this research showed general agreement that certain characteristics such as weather,school holidays, and special events influence tourist demand. It explores an alternative vision, analyzing the supply determinants of seasonality related to accommodation services as a representative sector of tourism. The data came from the Economic Research Center and direct interview from some establishment managers. The final results derived from the behavioral model evaluation. From a demand perspective the results showed that the most popular tactics for reducing yearly peaks and troughs have been the organization of special events and festivals, the identification of new market segments, and promotional pricing. From a supply perspective the tactics include expanding the current capacity to

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deal with peak-period demand and closing enterprises during the low periods. Authors suggested that for the private sector, results can help justify quality service investments related to expanding the high period and increasing efficiency through lower fluctuation. For public administration, results can justify restructuring industry policies to promote transforming lower-quality hotels into higher and converting them from the silver to the gold category.Richins, H. 2009.

Environmental, cultural, economic and socio-community sustainability: a framework for sustainable tourism in resort destinations. Environmental Development Ssustainability , Vol. 11, pp. 785–800. Based on the belief that community -based sustainability framework is more than important to mitigate the green-house effect, Richins focuses on a resort destination in providing a potential model for more inclusive long-range destination planning and implementation. The model attempts to address the many difficult challenges of development through more inclusive and comprehensive long-range destination planning, implementation and management. In order to identify the socio-community assets the study includes the important sub-areas of focus including i) the visitor economy with a focus on achieving a viable tourism economy, ii) the brand or identity—that is Noosa as a destination and how a strong brand will enhance the regional tourism industry and its relevant stakeholders, iii) a major focus on achieving a viable tourism industry through new and existing product development, iv) gaining and maintaining quality employment, v) enhancing and achieving sustainable capital investment in the property and other financial assets, and vi) through the continued improvement of quality tourism products and its visitor economy, in turn related and peripheral businesses also are provided with support. Important aims were to achieve a viable tourism industry through providing diverse tourism products which meet sustainable tourism standards, providing excellence in facilities, an d developing viable business practices based on strategic approaches for improved market share for Noosa. In addition important aims for product development and operation included achievement of best practice service, accessibility, presentation, range and value for money, in all product categories and in all sectors having contact with visitors. Scott, D., G. McBoyle, M. Schwartzentruber. 2004. Climate change and the distribution of climate resources for tourism in North America.Climate Research , Vol. 27, pp. 105-117. The purpose of this study was to investigate current patterns and potential changes in the spatial and temporal distribution of the climate resource for tourism in North America using the TCI and 2 climate change scenarios.The paper discussed the implications of the changes in the length and quality of tourism offerings on tourism enterprises and competitive relationships between destinations.

The paper used a tourism climate index in order to assess the spatial and temporal distribution of climate resources for tourism in North America. In the methodology the climate change scenario is used for analysis of tourism climate index variables. A total of 143 North American cities were selected for this analysis: 90 in the USA, 44 in Canada and 9 in Mexico. The cities were selected on the basis of 3 criteria: significance as tourist destinations, data availability, and regional spatial representation.The paper revealed that projected climate change substantively will redistribute climate resources for tourism. It is suggested that lengthened summer season will expand the domestic and international tourism markets and expenditures.

The paper concluded that some cities are gaining climate suitable for winter sun vacations and there will be increased destination choice and competition for the short-term winter sun holiday. Scott, D., G. Mcboyle and A. Minogue (2006) Climate Change and the Sustainability of Ski-based Tourism in Eastern North America: A Reassessment. Journal of Sustainable Tourism, Vol.14, pp. 376-398. Tzu-Ping Lin, T. –P. and A. Matzarakis. 2008. Tourisn climate and thermal comfort in Sun Moon lake, Taiwan. Int J Biometeorol

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Need for the Study:

The maruti suzuki had adopted climate change managment for ecological transformation which is must for environmental and social well-being So, this study has made an attempt to provide effectiveness and activities of maruti company in climate change managment.

Methodology:

This paper mainly based on secondary data. The articles which are published in the area of climate change managment in automobile industry have collected data for study and website of maruti company.

Maruti Suzuki strives to minimise the carbon footprint of its manufacturing facilities, products and supply chain operations. The Company believes that investing in environment friendly technologies makes business sense as it brings good returns in the medium to long term.

The environment policy of the Company promotes energy conservation, 3Rs (Reduce, Reuse and Recycle), green procurement, environment friendly mobility and environment consciousness among its direct stakeholders. Going beyond compliance, the Company works closely with its parent company, Suzuki Motor Corporation, to introduce the latest environment friendly technologies in India, much ahead of statutory requirements.Maruti Suzuki became the first automobile company in India to register a Clean Development Mechanism (CDM) project with the United Nations Framework Convention on Climate Change (UNFCCC). In due course, the Company will earn tradable carbon credits. The Company sends all its hazardous waste to the cement industry for co-processing.

All new vehicles are free of hazardous substances and comply with European End of Life vehicle regulations. The Company is working towards continuously improving the fuel efficiency of its cars.

GREEN MANUFACTURING

Maruti Suzuki follows SMC's basic philosophy of Smaller, Fewer, Lighter, Shorter and Neater in its manufacturing facilities.

Material use and weight reduction

The major raw materials used in vehicle manufacturing are steel coils, ferrous and non-ferrous castings, paints and thinners. The Company sources finished components used in vehicles from various suppliers.

The Company has undertaken various initiatives to optimise consumption of raw material. The scrap generated in press and casting operations is sent to suppliers to fabricate child parts or use in their processes for manufacturing relevant components.

The Company focuses on yield improvement to conserve critical resources. The scope of this activity was extended from the traditional sheet metal to plastics, electrical and casting operations.

Energy conservation

Maruti Suzuki's manufacturing sites at Gurgaon and Manesar run on captive power plants that use natural gas, a clean fuel.

Water conservation

Water conservation is an integral part of the Environment Management System at Maruti Suzuki. The Company has achieved zero wastewater discharge status (outside factory premises). Canal water for most of its manufacturing processes to conserve groundwater.

Air emissions reduction

The major source of greenhouse gas (GHG) emission at Maruti Suzuki is the combustion of fuel for power generation and process requirements, accounting for over 90% of the Company's total GHG emissions.Ambient air quality and stack emission parameters (SOx, NOx, SPM etc.) are monitored regularly by a government approved external agency.

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The monitored values are well within the prescribed limits of the Pollution Control Board.

Solid waste management

The hazardous wastes produced as by-products of manufacturing operations at Maruti Suzuki include paint, phosphate and Effluent Treatment Plant (ETP) sludge, incinerator ash and used oil. The used oil is sold to authorised recyclers. This has eliminated the need for incineration and land filling. The saleable solid wastes such as metal scrap and glass waste are sold to recyclers. All in-process and vehicle related e-waste is disposed of through authorised recyclers only.

GREEN PRODUCTS

The Company's R&D division is enhancing its capabilities in component and vehicle evaluation, benchmarking and design optimization

Cleaner Technologies

Maruti Suzuki is committed to developing alternative fuel vehicles with revolutionary i-GPI technology. The frequent escalation in fuel prices has made customers prefer cars that use alternative fuels. Environmental considerations, coupled with high demand for fuel efficient cars, have brought alternative fuel options such as CNG, LPG, hybrid and electric vehicles into sharp focus. Maruti Suzuki has taken revolutionary steps in providing multiple fuel options for many of its models, simultaneously delighting customers and protecting the environment. The Company's alternative fuel vehicles incorporate the best-in-class technologies, are safe, eco-friendly and economically viable.

Hybrid and Electric Technology

Maruti Suzuki has taken up experimental projects in the field of hybrid and electric vehicles. Subsequent to the demonstration of SX4 Hybrid and Eeco Electric vehicles at the Commonwealth Games, R&D capability was further enhanced in HEV-EV by taking up study projects in areas such as HEV fuel efficiency, Idle Start Stop system, Range Extender etc.

OBD-II Implementation

OBD is a tool to diagnose the health of a car with respect to its emissions that helps in speedy identification and rectification of emission-related faults in the system.

Restriction of Hazardous Substances Elimination & Vehicle Recycling Initiatives

Maruti Suzuki has voluntarily taken the initiative to eliminate chemical substances of concern such as lead, cadmium, mercury, hexavalent chromium and asbestos. These substances are detrimental to the environment and human health. All Maruti Suzuki vehicles, except the old models (M800, Omni and Gypsy), comply with European ELV norms.

GREEN SUPPLY CHAIN

Maruti Suzuki has a supplier base of 267 suppliers, including 20 joint venture companies. Most of the suppliers and joint venture companies (contributing 86% by value) of the components sourced by the Company, are located within a radius of 100 km.

Optimisation of logistical operations

Maruti Suzuki is committed to reduce pollution caused by transportation of material.The central steel purchasing cell of the Company buys all imported steel on behalf of its vendors. This consolidation reduces movement of material significantly. Inland movement from the Maruti Suzuki facility to the port is planned through rail to avoid road congestion and minimise pollution during transportation. Similarly, the inbound transport of kits from the port to the Company facilities is slowly being transferred from road to rail.

Sustainability Parameters in Vendor Rating

The Company includes sustainability parameters such as ISO 14001 compliance and occupational safety in its Vendor Rating System. The Vendor Rating System is an effective tool for improving vendor performance in various parameters, and is one of the most important tools for promoting sustainability at suppliers.Maruti Suzuki strives to minimise the carbon footprint of its

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manufacturing facilities, products and supply chain operations. The Company believes that investing in environment friendly technologies makes business sense as it brings good returns in the medium to long term.The environment policy of the Company promotes energy conservation, 3Rs (Reduce, Reuse and Recycle), green procurement, environment friendly mobility and environment consciousness among its direct stakeholders. Going beyond compliance, the Company works closely with its parent company, Suzuki Motor Corporation, to introduce the latest environment friendly technologies in India, much ahead of statutory requirements.Maruti Suzuki became the first automobile company in India to register a Clean Development Mechanism (CDM) project with the United Nations Framework Convention on Climate Change (UNFCCC). In due course, the Company will earn tradable carbon credits.

The Company sends all its hazardous waste to the cement industry for co-processing. All new vehicles are free of hazardous substances and comply with European End of Life vehicle regulations. The Company is working towards continuously improving the fuel efficiency of its cars.The environment policy of the Company promotes energy conservation, 3Rs (Reduce, Reuse and Recycle), green procurement, environment friendly mobility and environment consciousness among its direct stakeholders. Going beyond compliance, the Company works closely with its parent company, Suzuki Motor Corporation, to introduce the latest environment friendly technologies in India, much ahead of statutory requirements.Maruti Suzuki became the first automobile company in India to register a Clean Development Mechanism (CDM) project with the United Nations Framework Convention on Climate Change (UNFCCC). In due course, the Company will earn tradable carbon credits. The Company sends all its hazardous waste to the cement industry for co-processing. All new vehicles are free of hazardous substances and comply with European End of Life vehicle regulations.

The Company is working towards continuously improving the fuel efficiency of its cars. Safety is the key pillar of manufacturing excellence at Maruti Suzuki. Over the years,the company the has institutionalised robust systems for proactive identification of hazards, safety audits and mitigation of safety risks. The Company has successfully implemented OHSAS 18001:2007.The Company has designed and implemented various initiatives to achieve zero injury and fatality. These included a rigorous work permit system and an online incident reporting system called Work Safe Online, through which incidents including near-miss cases are captured and reported. The Safety and Welfare Department ensures workplace safety, undertakes awareness and training programmes and executes a safety activity plan that is planned and rolled out each month. In addition to plant level safety committees, departmental safety committees have been formed. The Central Safety Leadership Council (CSLC) comprises top management from all business verticals and reviews safety performance of the Company on a quarterly basis.All contractors and service providers working within the Company premises are required to observe 'Safety, Health and Environment' conditions. Separate training and awareness sessions are organised to sensitise them on occupational safety.

Conclusion:

Maruti suzuki has been implementing the process such as green manafucturing,green products,green supply chain to specify the climate change managment techinqiues in their organisation for ensuring geo engineering and ecological safety.

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