



A STUDY ON CUSTOMER BEHAVIOUR ABOUT THE REPLACEMENT OF SYNTHETIC TEXTILES IN AUTOMOTIVE SEATING

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Abstract: *As concerns about the environment and the depletion of petroleum resources have increased, so has the importance of natural fibres in textiles. Sustainable fibres have been promoted to researchers and the automotive industry as an alternative to traditional synthetic fibres. In addition to their exceptional mechanical and physical properties, natural fibres offer attractive properties that make them suitable for a variety of textile applications, such as reinforced composite materials used in automotive furnishings. This survey's main objective is to ensure consumer opinion and satisfaction with naturally colored textile fabrics for automotive applications made with recycled cotton fibres and sappan wood; these factors should be prioritized when developing a support system that satisfies customer needs. By assisting automakers in better understanding what customers actually need from their cars, our findings may facilitate the more targeted development and optimization of such natural sources, increasing product competitiveness and promoting the green transition. For this study, the intended customer base was given natural seat coverings in order to examine the elements that lead to the replacement of synthetic materials in automotive seats. The study also aimed to offer recommendations for more consumer demand research in the future.*

Keywords: *Car furnishings, customer opinion, recycled cotton fibres, sappan wood, Seat covers.*

1. INTRODUCTION

Technical materials that aren't used for clothing are used in passenger car interiors, particularly in luxury classes. Textiles are utilized for both hidden and apparent components, such as airbag material, fuel/air filters, hoses, and safety belts, as well as for aesthetic purposes in areas such as headlining, door panels, parcel shelves, and carpets. Typically, a passenger automobile is thought to contain between 12 and 15 kilograms of textile material. It is estimated that the amount of textiles utilized in the automobile industry worldwide is about 0.5 million tons, or 2.2% of the total weight of the vehicle. In India, knitted fabric is used in the luxury category of automobiles, whereas woven fabric is used in about 80% of cars. The bulk of industrial textiles are used in the construction of cars, buses, trains, aero planes, and marine vessels. One possible source of volatile organic compounds is one of the many synthetic raw materials used to construct car interiors. Consequently, these sources could be to blame for the common automobile odours, especially in recently acquired and parked vehicles. The vehicle seat covering is a crucial part of the interior of an automobile. Seat coverings must not withstand extremely high or low temperatures. Major automakers' cars all have synthetic seat coverings as standard equipment. Usually, seat coverings are spin bonded with a rubberized backing and are made by an integrated process that includes melting polymer chips and using a die to remove filaments. Usually composed of polyester, this kind of seat cover also occasionally has a blend of nylon and polyester. The use of these kinds of seat coverings made of synthetic cloth contributes significantly to air pollution in automobiles and the environment. The car's shifting surroundings and synthetic textiles also contribute to the car's interior odours and dangerous emissions.



The main objective of this article is to investigate customer concerns related to the use of synthetic car seat covers, as well as their experiences and behaviors while utilizing natural car seat covers made of cotton fabric that has been naturally colored.

1.1 STATEMENT OF THE PROBLEM

The increasing globalization and liberalization of the Indian market has led to competition among the automobile industries for market share. Automobiles are increasingly considered needs and an essential component of daily life, rather than a luxury. Customers no longer think that what was once considered a luxury is now considered a need. It is vital for marketers to comprehend the views of prospective clients and track the variables influencing those thoughts in order to achieve success. Not only that, but a less polluted and more health-conscious future is also projected. Establishing a framework that enables the replacement of synthetic and natural textile materials in automobile accessories is crucial. The paper discusses the shift in automotive upholstery from synthetic to natural materials. A lot has been written about the shift to synthetic automotive fabrics, consumer challenges, and benefits to economy, ecology, and vehicle dependability.

2. REVIEW OF LITERATURE

2.1 AUTOMOTIVE TEXTILES

Environmentalists main be concerned is the automobile. The pollution caused by vehicle exhaust and the development of highways through pristine countryside have made it widely known. In actuality, there are three primary categories of environmental considerations that pertain to cars: issues with disposal, real usage, and production. All three involve textiles and have a substantial impact on the environment. The textile business utilizes procedures including laminating, joining operations, dyeing and finishing that have the potential to be extremely harmful to the environment. Polluting gases are released by the automobile as soon as it is driven out of the showroom and continue to be released throughout the duration of its operation. Improvements like as catalytic converters are being created in an effort to lessen this. Along with improved engine efficiency that results in lower fuel consumption, automobiles have also gotten lighter overall and more aerodynamic. Through the growing usage of fibre composites in place of heavier metal components, textile advancements are helping automobiles become lighter. Original Equipment Manufacturers (OEMs) will have to take responsibility for the free disposal of all junk automobiles, also known as end-of-life vehicles or ELVs, by the year 2006 under recently passed law. A minimum of 85% of the car's weight in materials must be recycled, with no more than 15% ending up in a landfill. The numbers will rise to 95 and 5%, respectively, by 2015. The majority of the car's weight, or around 75% of it, is made up of several classes of materials that must first be recognized before being separated. These materials are collected from old automobiles and repurposed. Because of these procedures, disassembly is time-consuming and costly, which makes recycling non-metallic components now unfeasible. However, a lot is being done to improve this, as will be covered later. Disassembly is now taken into consideration throughout the design process, and in an effort to facilitate recycling, as few chemical plastic and fibre types as feasible are used in cars. Generally speaking, efforts are being undertaken to apply the environmentalist watchwords of "reduce, reuse, and recycle" to the motor sector. But this usually comes at additional expense, and in many situations, government action—or the fear of government action—has been necessary—and is probably going to be necessary—to guarantee that particular protocols are followed. Salespeople told me more than ten years ago that being "green" did not sell automobiles, but over time, people are starting to see it as a marketing tool. Businesses today want to project an image of social responsibility and environmental friendliness. They support the idea of "sustainable development," which is defined as the goal of satisfying current demands without jeopardizing the capacity of future generations to satisfy their own. These days, a lot of industrial companies publish yearly environmental reports and have ISO 14001 accreditation or are striving towards it. Nowadays, the majority of people on the planet is conscious of and concerned about the critical environmental problems that affect all of mankind. This chapter explores the problems and the several initiatives being undertaken to create automobile accessories that are more ecologically friendly.

2.2 CAR SEAT ACCESSORIES

Among the interior automobile components, the seat is arguably the most significant. When the car door is opened, the consumer will likely touch it out of impulse because it is the first thing they notice. In addition to replacing polyurethane foam in other parts of the seat, textiles are now the most commonly utilized material for seat covers. In some specialized situations, they are also utilized in place of metal springs, seat pans, and seat backs.

Polyester is a highly common material for constructing seats these days. It is used for seat cushions and squabs, as well as for face fabric and non-woven cover laminate. Traditionally, seats are made by cutting and stitching panels



of the face cloth, foam, or scrim that make up the seat cover lamination. The cover is then pulled over the squab (the back of the seat) and Cushion (the bottom of the seat), and secured in place with a variety of clips and fasteners. This is a laborious and time-consuming operation. As a result, several attempts have been undertaken over time to identify more effective methods utilizing a range of strategies. The three-dimensional seat coverings of today are excellent. A seat cover is made out of a three-dimensional structure that is knitted into a single piece that at least has main, side, and welt components and has an exterior shape similar to that of a seat. Additionally, the knitting consists of pieces that are knitted integrally that cover the seat's overhang, corners, and/or back and bottom sections. However, the opposite side of these synthetic materials led to serious air pollution issues. One of the two main environmental issues is declining urban air quality (the other being agriculture). One aims to reduce car emissions from petrol engines by up to 40% and those from diesel engines by half by the year 2000. Plans are also in place to lower the amount of sulphur in fuels and implement additional controls on the emissions from automobile exhaust. A directive requiring member states to create national reduction strategies for volatile organic compounds (VOC) is also being processed by the government. The target is a 66.6% decrease in VOC emissions from 1990 levels. This action is probably going to have an impact on industries that use solvent-based adhesives extensively. Nonetheless, volunteer efforts have made extremely large contributions to clean air while also saving money. The National Air Quality Strategy established air quality requirements under the Environmental Act of 1995 and it is the duty of local authorities to make sure that, after 2005, the established limits are not surpassed in their jurisdiction.

2.3 AUTOMOTIVE TEXTILE PERFORMANCE

Producers of automobiles and textiles take environmental, health, and safety problems extremely seriously, as do most big enterprises. Every significant manufacturer has set up environmental management systems and policies. The 1992 policies and standards were created to help the industry set up efficient environmental management systems for management reviews, involvement in environmental auditing processes, and good environmental performance. This standard was compliant with the Environmental Management Audit Scheme (EMAS), a voluntary environmental management scheme that was drafted by the European Commission and linked to the quality management standard systems.

2.4 HEALTH AND SAFETY ASPECTS

Naturally, the Control of Substances Hazardous to Health (COSHH) regulations of 1994 (which superseded the original 1988 regulations) and March 1999 apply to all chemicals and materials used in the textile and automotive industries. These regulations address every facet of acquisition, handling, transportation, storage, use, and disposal. Regular reviews of the evaluation are required, as well as after any major process modifications. Hazardous materials can be gases, vapors, liquids, fumes, dusts, solids, or microorganisms. The Classification, Packaging, and Labeling of Dangerous Substances Regulations of 1984 also apply to hazardous materials when they are transported or stored.

2.5 AUTOMOTIVE TEXTILES IN CONSUMER PERSPECTIVE

A growing number of consumers are increasingly seeking information on the possible presence of hazardous substances in automobile interior trim components, as some are becoming concerned about it. Hazardous material assessment forms are provided, and on these are listed substances like lead, nickel, cadmium, mercury, and some organic compounds like bromine. These chemicals must be disclosed together with their concentration in parts per million of the final product, as well as their use in the production process. Certain flame-retardant properties of cloth and polyurethane foam contain compounds that emit halogen and phosphorus. Consumer concerns must be taken seriously, even if the danger to health from this source is probably very minor when compared to comparable chemicals in certain clothing or even household furniture. The chemical industry has tried hard to replace these materials, but has had only patchy success thus far. To have the same result, alternative chemical concentrations must be higher. Nevertheless, there is still uncertainty around the issue, particularly in light of the discovery of bromine compounds in animals and the marine environment. However, other scientists think that flame retardants have more advantages than disadvantages for the environment and public health.

2.6 REPLACEMENT OF SYNTHETIC FIBRES

The automobile industry has seen a resurgence of using natural materials in recent years. The argument is that using renewable raw materials is more ecologically friendly than using synthetic fibres and plastics, which are often derived from finite oil supplies. Natural materials also have technical benefits like adherence to plastics and physical qualities, but they are also more biodegradable than most synthetic ones. Researchers are looking at using cotton, flax, sisal, jute, and hemp as long fibre reinforcement in polyurethane injection moldings for door panels and other



applications, in place of the costlier glass. Certain items are in use and are available on the market. The new feature is that, although the binding between the stiff section and the covering decorative material is managed to be sufficient for the intended use, it nevertheless permits the materials to be separated to make recycling easier when the car's life comes to an end.

3. METHODOLOGY

The characteristics of the consumer, which are reflected in his attitude, motivation, perception, personality, knowledge, and way of life, coexist with economic, technical, political, cultural, demographic, and natural aspects. Marketers need to understand the behavior of their target audience in order to defend their existence. Modern chemical analysis has advanced, but sensory analysis remains the gold standard for determining perceived interior air quality in cars. A total of fifty customers, selected from both urban and rural areas, are given surveys with twenty-four standard questions on them. The purpose of this survey is to categorize consumer behavior into five categories based on the following:

- i. Personal information.
- ii. Basic Details of their cars.
- iii. Awareness of the fibre-fabrics presently used in their car.
- iv. Understanding and behavior with relation to natural fibre furnishing.
- v. The overall driving experience with natural seat sitting. *Figure 1* shows Customer behavior survey form.

QUESTIONNAIRE FORM-II

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I am M. Sasikala, Ph.D. research scholar at Bharathiar University, Department of Textiles and Apparel Design. I'm working on doctoral research, and as part of my primary data collection, I'm surveying people to find out what they think about how useful my product, a natural car mat, is. Please complete the questionnaire, which is a thorough portion of my study. Your answers are extremely important to me as I gather data. Please refer to the questionnaire in the attachment, and feel free to add any other notes. I sincerely appreciate your help in advance.

1. Name : _____
 2. Age : _____
 3. Gender : Male Female Transgender (Tick in the given box)
 4. Occupation : _____
 5. City/State : _____
 6. Type : Urban Rural
 7. Car Brand : _____
 8. Car Model : _____
 9. Type of car seat covers already used: Natural Fabric Synthetic Fabric
 10. Price Range of the seat cover: 100-500 500-1000 1000-1500 Above 2000
 11. Do you think the seat cover you are using now is comfortable? Yes No
 12. If it is NO what are the disturbance you feel?
 Non Breathable Hot and Slippery Back sweat Irritation
 13. Did you experience any health issues due to the seat covers? Yes No If Yes, mention it _____
 14. How does an uncomfortable seat cover affect your mood?
 Disgust Anxiety/Stress Worsened Mood Unpleasantness
 15. Did you use any natural textile material for this problem?: Yes No
 16. Are you aware of Natural seat covers: Yes No
 17. Will you prefer Natural seat covers for your Car?: Yes No
 18. Would you like to use my Natural seat covers? : Yes No
 19. How long have you used my Product?
 1 Day 2 Days 3 days
 20. Which one type of seat cover will you prefer the most? Woven Knitted
 21. Rate my product based on your usage. (Based on Customer Satisfaction Score-CSAT)
 (Kindly tick in the given box)

S.No	Particulars	★	★	★	★	★
		Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied
1.	Comfortable					
2.	Texture/softness					
3.	Sweat absorbency					
4.	Breathability					
5.	Fragrance					
6.	Natural Colour					
7.	Quality					
8.	Design of the seat cover					
9.	Fitting					
10.	Overall experience					

22. Recommendation for the product: Reuse Recycle
 23. Any other : _____
 24. Signature : _____

Figure 1. Customer behavior survey form

4. RESULT AND DISCUSSION

This research provides information on the factors that influence the luxury car market, such as:

- Demographic factors: consumer patterns, spending power, and income growth.
- Requirements from customers: Luxuriance, prestige symbol, technical features, etc.



- Socio-cultural factors: These comprise people's preferences and lifestyles, which have an impact on the vehicles they select.
- Social: Practices that impact the decision to use or own an automobile as opposed to taking other modes of transportation. *Chart 1* presents the results of the study conducted with consumers.

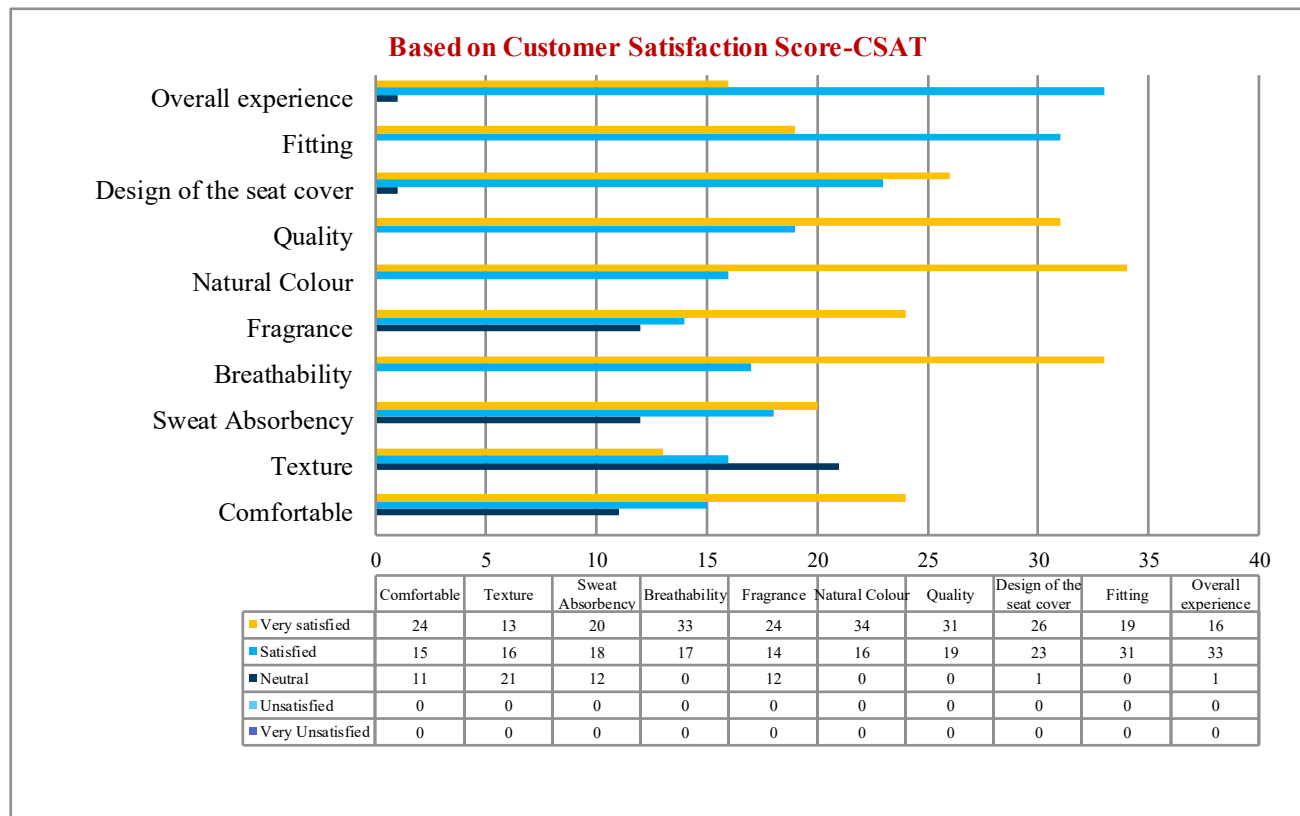


Chart 1. Customer Behaviour based on CSAT

5.CONCLUSION

Consumer behavior encompasses all actions taken by people while making decisions, both before and after making a purchase. One can only succeed in the competitive market after realizing how complex client behavior is. A marketer with a deep understanding of the consumer may make marketing decisions that are in line with their needs. Research has identified a number of key groupings of consumer behavior variables and expectations, including technological and product-related aspects as well as social, psychological, political, geographical, and demographic factors. If human behaviors are further divided into large categories, automakers will be able to link their strategies with customer behavior. Higher class cars, including Executive and Premium models, are typically selected by customers based on the brand's reputation, which reassures them that their needs for features, performance, and safety will be satisfied. The environment and cost control are the two key variables that are anticipated to continue to impact research and development in the automotive sector for the foreseeable future. By developing strategies to enable the recycling of auto parts and creating materials with reduced weight, the textile sector may make a positive environmental impact.

The face cloth of a textile is typically inextricably linked to a different substance, which is typically chemically distinct, making textile recycling difficult. There are chances when a textile is used in lieu of this other material to assist lower the number of chemical kinds and hence improve recycling. But the biggest way textiles are probably going to improve the environment is through composite materials, which take the place of heavier metals and drastically lighten cars. Commercial considerations including joint ventures, firm mergers, and the economics of large-scale purchasing and production are driving down costs. By creating innovative manufacturing techniques that integrate two or more processes into one, technology is making a contribution. These innovative methods will keep being developed and enhanced since they boost productivity while lowering human error and delivering more consistent quality. Improvements in communications and information technology are also a factor in lower expenses and increased



productivity. Global brands that are strategically sound will assist these firms project a more positive image worldwide, regardless of the money or educational attainment of their status-seeking clients.

6. VISIONS OF THE FUTURE

The one need that can be safely anticipated to persist is that design and styling—especially inside the car—must keep up with the evolution of external body forms and trends. This is something that textile goods can contribute significantly to, as the last ten or so years have forcefully shown. What matters is not if this will continue, but rather which textile technology will prove to be most effective in meeting future development needs in terms of flexibility, scope, responsiveness, high performance, etc. across a variety of substrates. While the answer to this issue is still unclear, there are evident benefits to having vast inventories of standard textiles that can quickly be transformed into figured products once the requirements are understood. These days, we identify this as the domain of the jacquard, whether it is knitted or woven. Though printed fabric can do the job better, printing was a contact process until recently, which changed the fabric's aesthetic qualities in some way—usually not in a good way—and required very high throughput to be economically feasible. This presents an opportunity and a vision for the future for everyone in the interior trim fabric production industry, therefore they should all be carefully considering it.

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