9.1 Summary

This thesis has presented a broad study of the consumer preferences, purchasing patterns, post purchase problems of the consumers and an evaluation of the relative performance of commercially available uniform fabrics. Particular emphasis has been placed on various aspects of consumer preferences regarding uniform fabrics manufactured by the textile industry and the main aim of the work has been two fold: to further the understanding of the characteristics of the uniform fabrics and to relatively rate the performance of the fabrics selected. As a first step, a comprehensive questionnaire was prepared to elicit information from the consumers pertaining to general fabrics and uniform fabrics. In the second stage, a total number of 10 samples of commercially available fabrics were obtained. The distribution of the uniform fabrics was as follows: four were made of 100% cotton, three manufactured from polyester and cotton in the proportion of 80:20, 67:33 and 50:50, two fabrics constructed from polyester and viscose in the proportion of 50:50 and one made from 100% polyester. In view of the fact that a variety of fibres have been used in them and the
fact that they vary appreciably in cost, the ten fabric samples represent a very complete sampling of all available commercial fabrics.

In earlier investigations, only a few of the properties were evaluated to judge their relative performance. In the present work, many aspects of the uniform fabrics have been evaluated by recourse to sophisticated techniques. The conventional tests have also been performed on the fabrics to evaluate their characteristics.

A comprehensive questionnaire has been prepared to obtain information about the choice of the uniform fabrics made by the consumers and the factors that are considered in buying them. A very simple technique has been developed to determine moisture content of the fabrics from which it is possible to have an idea of the blend composition. It is the normal practice to evaluate the performance of fabrics by testing their tensile, tear and wear properties using conventional techniques. Although they are useful in giving an idea about the longevity of the fabrics, they suffer from drawbacks in that during wear the fabrics are no longer subject to so much of stress. In order to evaluate the deformations which take place in the case of apparel fabrics, test equipment for bending and shear were designed; extensive
measurements were made on the uniform fabrics, both in unlaunched and laundered states. Besides these, an apparatus for determining the thermal insulation characteristics was designed and used. The effect of multiple washings on the mechanical and aesthetic properties has been investigated. In order to assess the relative performance of fabrics, multiple soiling tests have been performed. From the data collected in this work, it has been possible to have an idea about their performance in actual use and to recommend the most suitable ones to the various agencies which use them.

The results of the Consumer Survey, in which 600 consumers were interviewed, constitute a significant advance in the understanding of the consumer preferences. The study of many other aspects of the uniform fabrics presented in Chapters 4, 5, 6, 7 and 8 has also produced very useful results.

Phase I

9.2 Conclusions of consumer and market survey
1. Consumers prefer blended fabrics for general use and for uniforms due to reasons like ease of care, good appearance, and durability, irrespective of their socio-economic status. Price, durability and ease of care are
the important factors considered while choosing the fabric. The type of occupation, age, income, size of the family, rural urban background, education, have no direct bearing on their preferences.

2. Wearing comfort is not considered a criterion for selection of fabrics. In the absence of sufficient product information, consumers assess the quality based on information gathered from different sources.

3. Mass media methods are effective only in making consumers aware of the product, while commercial sources are helpful in giving specific information after the buying decisions are made. Advertising and other mass media sources have no effect on their decision at the point of purchase.

4. Before making the purchase, consumers judge its quality and compare the prices. In the absence of reliable information, consumers associate high price with quality.

5. The final selection of the fabrics depends upon their past experience, salesman's recommendations, coupled with their testing the fabrics. A majority of the consumers do not look for label information as they are not reliable and informative.
6. Consumers, in general, are not able to distinguish between brand names and company's name. Post purchase experience positively influences clothing purchases.

7. A significant number of the consumers is of a non-complaining nature. This sort of attitude is more because of the poor response or indifference to the complaints by those concerned with rectifying such product defects. Higher educational level is a significant factor in awareness of brand names and in methods of judging the quality of the product.

8. There is no significant difference between preference of fabrics for general use and for uniforms. The consumers are unaware of uniform fabrics made by Handloom and Khadi Sectors.

9. Consumers, in general, have less knowledge of basic textiles, care and maintenance. Irrespective of parents' income or childrens' age, parents prefer blended fabrics for the uniforms of their children.

9.3 Recommendations

1. Information on labels should contain more details than what they provide. Consumer price, instead of ex-facto:
price, may be stamped on each metre of the fabric, along with other reliable information like brand name, colour and care required, etc.

2. Consumers should be made aware of different types of blends that are available with their performance characteristics. Consumers should also be informed about suitable care for different types of fabrics so as to get optimum benefits.

3. The poor impact of mass media and commercial sources suggests that manufacturers should provide useful and reliable quality information through labels and tags which could be easily followed by the common consumer.

4. Textile companies should embark upon a programme of educating salesmen on the technical aspects of their fabrics through effective visual aids, so that reliable and quality information can be passed on to the consumers.

5. Since the existing forms of advertising for uniform materials seem to have little effect on consumers at the point of purchase, manufacturers should redesign their advertising campaigns so that they will have a better impact.
6. Consumers must be made aware of the assistance rendered by the Consumer Guidance Cell and Consumer Council of India. These agencies can find solutions to genuine consumer problems and grievances.

7. The curriculum of high school and undergraduate programme should incorporate suitable courses to educate the future consumers regarding their rights.

8. Manufacturers' association and consumer organization in collaboration can work out consumers' actual requirements and problems which would facilitate redressal of consumer grievances and safeguard the quality of the fabrics.

9. These bodies should set up standards in terms of quality, retail cost, production cost, labels and tags.

10. More number of Government retail shops, mill showrooms and Co-operative stores can be opened so that consumers can get quality products at reasonable cost.

11. Government departments and voluntary agencies should check and enforce the following:

(a) Quality of the product, and

(b) Correct stamping of maximum retail prices on every metre of the cloth.
12. In order to encourage the consumers to use Khadi and Handloom fabrics for uniforms, the authorities who supply blended mill material to their employees can switch over to supply Khadi and Handloom blended materials instead of mill blended ones.

13. Agencies like Indian Standard Institution (I.S.I) should update the old specifications and additional specifications should be formulated for uniforms in view of newer blends of fabrics available in the market. These specifications may be made compulsory for all types of fabrics.

14. I.S.I in collaboration with consumer organizations, quality control section of the mill, and Government departments should enforce quality standards on fabrics.

15. The Government can formulate effective mass media programmes so that the consumers may be made aware of uniform fabrics made by Khadi and Handloom sectors.

16. As most of the parents, irrespective of their socio-economic status, prefer to have blended uniform fabrics for their children, manufacturers can supply uniform materials directly to school canteens, thus avoiding the middle men taking the large amount of profits.
17. Since most consumers are unaware of proper care and maintenance of the different types of materials, agencies like Consumer Guidance Cell, Indian Chamber of Commerce and Industry, etc., should convey suitable care practices through effective mass media. The contents of the soaps and detergents, optical brighteners, etc., should be clearly indicated on the cartons. A fairly good knowledge of the effect of the different types of soaps and detergents on various fibre types is essential to make the right choice.

Phase II

9.4 Conclusions on performance characteristics of uniform fabrics

1. The serviceability performance of fabrics E (67p/33c) and G (80p/20c) both at unlauntered level and even after 100 washes is relatively good. As is evident from S.E.M., photographs fabrics E and G have undergone minimum damage at the terminal point of washing.

2. Fabrics G and E possess the highest toughness index, indicating that they will be able to withstand a high intensity of wear.

3. Blended and carbonized polyester fabrics perform well in terms of ease of care of fabrics. These fabrics pick up less soil compared to cotton.
4. Almost all the colours used in uniforms seem to be fast, washing up to I.S.O. washing test 3 and to crocking, pressing, perspiration, and light, except maroon colour which is not fast to wet crocking.

5. Fabrics G and E have good crease recovery, drape coefficient, bending recovery, thus satisfying the aesthetic requirements of the consumer.

6. Bending and shear parameters of the uniform fabrics have shown significant reduction following washing treatments.

7. Fabric C (3/1 twill weave) can be considered the next best fabric as far as serviceability and aesthetic properties are concerned.

8. Cotton fabrics and 50/50 provide comfort lending properties.

9. Although carbonized polyester has certain drawbacks regarding pilling, it is found to be suitable for shirtin and dress fabrics. Fabrics G and E are suitable as suiting materials.

10. The performance of fabrics G and E in wet tests is relatively good, indicating that they can be
washed frequently (as expected from a uniform fabric) with moderate amount of friction.

11. **Analysing the economic index, polyester/cotton blends and carbonized polyester, although expensive initially, they are found to be cheaper in the long run in terms of its strength, aesthetic property and ease in maintenance.**

12. **Fabric G (80_p/20_c), manufactured from 100% texturized filament yarns in weft, has been found to be stronger in all the properties evaluated.**

13. **Rapid test method developed to find out the moisture content of the fabric is to be preferred to know the blend composition of the fabric quickly.**

### 9.5 Recommendations

1. **Fabric D (cotton, cellular weave) is being supplied by most of the organizations to their employees as uniform shirting material, along with fabric G (cotton 3/1 twill). Since fabric D is found to be poor in its performance, both in subjective and objective evaluations, carbonized polyester shirting material may be supplied instead of fabric D.**
2. The school authorities, while prescribing the colour of the uniform material, should also specify the suitable blend compositions so that they will form a guideline for their selection of uniform fabrics.

3. White shirting material is being used for shirts or dresses for uniforms with coloured trousers or skirts. Since a majority of the parents prefer to have light coloured material for ease in maintenance, light coloured shirting material may be recommended instead of white.

4. As most of the respondents from occupational groups are found to be exchanging the cotton uniforms which are supplied to them for blended fabrics and thereby incurring certain loss, the authorities concerned may supply blended fabrics as uniform fabrics.

5. Fabric G (80/20) with 100% filament, texturized weft polyester yarns and fabric E (67/33) are found to be stronger as evaluated by strength tests. Considering their superior performance in all the properties tested, these materials may be recommended for uniforms.

6. I.S.I specifications for uniforms, which at present are given only for handlooms and cottons, may be extended to the new blends available in the market.
7. I.S.I., besides giving breaking strength, colour fastness and dimensional stability, other properties such as drape coefficient, bending crease recovery, etc. need to be specified.

8. The findings of this study may be made known to the general public and concerned institutions through local newspapers, magazines and booklets. This will enable the effective utilization of the research findings.

9.6 Suggestions for further work

The following suggestions for continuing research are based on the various research problems encountered in this investigation. In most cases, the experimental results presented here should form the starting point for continuing research.

1. The consumer study regarding preferences and purchasing patterns of uniform fabrics may be extended to other occupational groups such as Military, Navy, Air Force and other technical workers.

2. The study may be extended to District and Village level, in order to study their preferences for school uniforms.
3. A detailed study may be carried out to find out among consumers both from rural and urban areas regarding consumer awareness of new blends, label information, etc.

4. The influence of finishing treatments, such as silicone finishes given to polyester/cotton blends, needs to be further investigated.

5. The wear index and economy index need to be elaborately studied for all types of fabrics used for uniforms. This information may be made available to the common consumer for it will give him guidelines for his choice.

6. The effect of different types of detergents on uniform fabrics may be carried out.

7. A detailed study on soiling of coloured fabrics with different fibre content and blend composition is necessary.

8. Tailorability, hairiness, handle and formability of uniform fabrics may be investigated in detail by sophisticated methods and these may be included under specifications for uniforms. With the inclusion of these methods and a proper statistical analysis which Kawabata has suggested, a great deal of work should be carried out on the uniform fabrics.
9. A detailed wear study may be carried out with uniform materials representing a fairly heterogenous group (subjects involving various activities). The evaluation of the test fabrics should be purely subjective, unlike the conventional laboratory methods, so as to arrive at definite conclusions regarding the wear/performance of the same. This will enable them to arrive at a better assessment of fabric performance with different forms of activity and may even lead to setting up of standards in line with the series of studies conducted by Kawabata and coworkers*. Such a study, however, can be carried out only with the generous assistance from mills, research organizations, I.S.I., etc.

10. A wear study may be carried out on different blends and carbonized polyester materials which are used for uniforms, as this area needs to be explored.

11. It may be useful if some work is carried out on engineering the uniform fabrics by recourse to computer programming using optimal control theory.

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The quality aspects of different types of tested fabrics reveal some useful and interesting findings, but they need to be interpreted with caution as the number of fabrics tested is limited.