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## ENHANCING THE FABRICATION OF MOTORSPORTS GEAR IN SRI LANKA

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### **ABSTRACT**

*Motorsports has become a universal sport. Many researchers have discussed about the fitness levels of racecar drivers. But none has given an in depth guide into the problems that are faced by drivers in the perspective of Sri Lanka. Motorsports was introduced to Sri Lanka during 30s from that day onwards the interest among the people for this has increased significantly. The focus of this study is on Sri Lankan motorsport apparel. It discusses the problems faced by Sri Lankan racers to comply with international sport and safety standards when it comes to choosing racing gear, which is affordable as well as, comfortable. The study further explores the possibility of locally manufacturing racing gear to cater to an increasingly growing enthusiasm for motorsport in Sri Lanka. Through a review of literature, the report looks at various fabrics that are internationally developed for competitive racing to discern modern standards and trends. The empirical data is gathered through in-depth interviews with key informants from the local motorsport arena to analyze issues faced by them with regard to their safety and comfort when selecting racing gear. Solutions for enhancing the fabrication of the gear while minimizing the problems faced. Through a SWOT analysis the study finds that it would be possible to locally produce affordable motorsport gear within reasonable parameters. Keywords: Motorsports, safety, comfort, affordable, enhancing, fabrication.*



## INTRODUCTION

### Background Research

Motorsport is a universal term which includes a set of competitive events involving motorized vehicles. Motorsports date back to 1867 and from that day onwards motorsports began its journey and now it is one of the renowned sports recognized universally. Although the technology of the car evolved the racecar drivers did not evolve. Their safety was a major issue because the number of deaths increased and well-renowned drivers lost their lives.

The safety of the drivers began to be thought of more during 1963- 1967 when the fire resistant suit was made compulsory with protective helmets (Seas, 2016). By 1975 the Federation International De l' Automobile (FIA) standards were introduced to provide guidance to meet the safety requirement. With time many brands came into play with different technologies to satisfy the customer requirements. This gear was not only a general clothing but performance wear, where it helped the wearer to perform well without any hindrance.

Motorsports came to Sri Lanka in the 1930's (Ceylon Motor Sports Club), and now it has grown to a great extent during the past few years with the increase of technology and - also with the interest among the youth. The main events for Motorsports in Sri Lanka are, "Fox hill Supercross, Gajaba supercross, and Gunners Supercross" (SLARDAR, n.d.).

### Significance of this Research

Motorsport gear is becoming more enhanced around the world with compliance to standards FIA/SFI standards. However Sri Lankan racers are still suffering with safety and comfort issues which can be solved through

Table 1: Brand Identification( (Sparco, n.d.), (OMP, n.d.) (Simpson PERFORMANCE, n.d.), (Alpinestars, n.d.), (Adidas,

n.d.)

enhancing the fabrication of the racing gear. While Sri Lankan apparel industry is currently focused in catering to more value added niche markets, developing a product that is suitable for the Sri Lankan racers will be an opportunity. The research identifies the capability to increase the performance of the gear with regard to safety, and comfort while satisfying an aesthetic value.

### Objective

To identify the problems faced by the Sri Lankan racers during an event.

To propose solutions to the problems faced by the Sri Lankan racers.

To analyze the pricing levels that suit the Sri Lankan market.





To evaluate the possibility of developing motorsports gear in Sri Lanka.

### Literature Review

In motorsports, FIA/SFI standards are the governing bodies which regulates the standards for the vehicle as well as the overall suit. According to the FIA regulations racers equipment should be approved by FIA 8856-2000. These standards are revised, with the development of technology and thereby the standards, code annually or biannually.

### Different Racing Brands in the Market

Following are the best products available in each brand, according to FIA standards. These brands are European based brands, which cater to racing drivers all over the world.

SPARCO	OMP	SIMPSON	ALPINEST	ADIDAS
				
\$2,000	\$1,799	\$1,599	\$1,749	\$879



Exclusive Nomex fibers, Lightest FIA approved suit.	DuPont Hi-Tech fabric, weight.	Nomex less	Titanium Nomex racing suit.	Ultra-light three layer Nomex construction.	Use of climacool for maintaining the temperature
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The figure (1) below shows the price range of each brand according to the Unique Selling Points which is the SFI standards. The USP of each brand differ, above table (1) shows the special features they have added in order to grab the customer base. The SFI standard shows the time range the suit would protect you during a fire before it fully buns to flame (Seas, 2016).

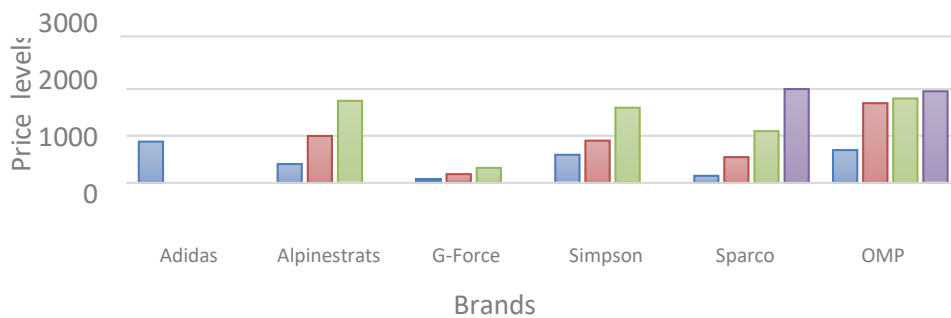


Figure 1: Pricing of Brands

### Customer Requirement of Motorsport Gear

According to (Lenoir Florian, Tony Dunn, 2010) motorsports should be a passion to the drivers not a threat. During a game of football, rugby or an athletic event the spectator sees the athlete, whereas, in motorsports you never know what’s happening inside (Mendel, Edward S. Potkanowicz & Ronal W., 2013)

Customer requirement of a general product can be classified into three as

Functional aspect

Aesthetic aspect

Fit of the gear

In a performance wear such as racing gear, key consideration should be given to functionality. Below sections describe the functional dimension of racing gear through the lens of the main classification.

Functional aspects

According to customer requirements the functional aspects is a main concern. As to (Lenoir Florian, Tony

Dunn, 2010) ‘Passive and active safety’ are the most important factors to be considered when developing a racing gear. Passive safety, safeguards the driver from any accident or fire, while active safety prevents the same accidents from occurring. Active safety is mainly about the comfort of the driver, movement of vital and struggle against heat stress (Lenoir Florian, Tony Dunn, 2010).

### Aesthetic Aspect

According to the season, “vintage” and also to the category of the event, “Porsche, Aerobatics, drag racing” (racerwear, n.d.) the design varies. Each category, the aesthetic aspect of the event is looked before it is brought. Even the colours play an important part.

As to Maslow’s theory, it is one’s self-satisfaction to wear branded suit. Sponsor logos are a must on designs, some customers like to have the logo and some prefer not to. As to FIA standards any outer embroidery that appears on the suit should be of fire resistant (Seas, 2016)

Fit of the Gear



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The suit must be fitted to the racer regardless of the other aspects because freedom of movement is an important factor when considering active safety. (425 Motorsports helps race car driver, Mike Holden pick out the perfect race suit!, 2013)

Functional Requirement

Safety

Table 2: Functional Aspect of the Gear for Safety

Product Attribute	Safety Requirement
Shoulder straps	It is one of the compulsory requirement in an FIA approved suit. It should have two large 'handles' on the driver's shoulder. This is used in case of an emergency to pull out the driver as one by without complicating injuries. (Seas 2016)



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<b>Zippers</b>	For the fastening method for the garment a zipper is used. And a Velcro is used to protect it. The zip should be able to withstand a higher degree burn and not melt. It should protect the driver from heat transferring near the skin. (Seas, 2016)
<b>Floating arms</b>	Floating arms are used to achieve the freedom of movement of the arm while driving. 360° rotating shoulder, with lot breathability and lot flexibility must be available for the racer to have a smooth drive. It's the arms that plays the game in a race for a driver
<b>Balaclava</b>	Balaclava is used to protect the racer from dust that's circulating inside the car. Also it is used to safeguard the racers face during a fire and also for moisture absorption.
<b>Muscular effort used</b>	The driver has to maneuver the steering wheel during the race and the steering is not power steering. According to Mendal, more physical strength to demanded by the upper body of a driver and also shoulder fatigue as the most common form of muscle soreness experienced after a race.  "61.24kg of force to brake pedal 15.88kg of twisting force each time when turning the wheel" (Mendel, Edward S. Potkanowicz & Ronal
<b>Increased body temperature</b>	The protective layers worn by the driver can create numerous microenvironments. Heat stress is another problem that can occur inside the car. This may cause cramps, heat exhaustion, rash, and stroke which can make you pass out during or after an event., due to limited airflow occurred through aerodynamic the temperature could rise to 70°C and humidity to 60%. (Lenoir Florian, Tony Dunn, 2010)  <i>Figure 2: Heat stress</i> <pre>graph LR; HS[Heat Stress] --&gt; T[Temperature]; HS --&gt; WS[Weight of the suit]; HS --&gt; TLA[Type &amp; Level of activity];</pre>
<b>Dehydration due to increase in heart rate</b>	Dehydration can occur when there is excessive breathing due to the intensified heart rate, the oxygen uptake is reduced due to dehydration and the environment temperature Armstrong (as cited in Mendel, Edward S. Potkanowicz & Ronal W, 2013). Also according to Greenleaf (as cited in Mendel, Edward S. Potkanowicz & Ronal W, 2013) he suggests that "body water losses equivalent to 4% of total body weight result in 20-30% loss of physical work capacity."
<b>G- force</b>	The acceleration the driver experience in a given situation is the G- force. The force can be a positive or a negative and may occur in any axis. David Coulthard former Formula 1 driver expressed that, the upper body has to withstand a pressure of 5G (50N), and during braking you feel like your hit hard on our back. (Stephen, 2008)

### 2.3.2. Comfort

Table 3: Functional Aspect of the Gear for Comfort

Product Attribute	Comfort Requirement
<b>Belt</b>	The belt is used to improve the fit of the suit (OMP, n.d.). The belt comes in different ways according to the brand. A full round belt or just a half round the waist belt.
<b>Stretch band</b>	Most of the current designs have stretch panels on the garment. This allows flexibility. When the racer sits down it pulls the extra material downwards and keeps the upper part tightened. This allows the driver to be more comfortable (425 Motorsports helps race car driver, Mike Holden pick out the perfect race suit! 2013)

### Product Attributes to Align With the Functional Requirements

#### Product Attribute Link with Safety

Product attributes that are available in the current market that fulfill the functional requirement of safety and comfort of the racers.

Table 4: Product attributes that's linked with safety

Safety Functional Requirement	as Product Attribute
Material	According to the FIA standards, the suit should be fire resistant and the DuPont has the patent for the Nomex® fabrication. The characteristics of Nomex (Seas, 2016) and Proban® (Seas, 2016) are the same but there is a slight difference in it. Nomex is rather a finishing technique which protects the racer for a higher degree burn. With the development of technology new cooling materials have been found one such is the Hocotex® which is a patented product of Sparco (Anon., 2016). Not only the outer layer but also the inner layers should be fire resistant or else it should be made out of cotton.
Fit of the Gear	Different brands have different methods to make the garment fit to the customer. One aspect is the belt on the waist. For online purchasing a how-to-measure is given on every brand. Figure (4) shows the how-to-measure from Stand21. To have an optimized suit a made-to-measure is done and sizes are in ranges; 42-66 sizes. It's a custom made, but yet again shops have many brands and it is up to the customer to buy the best suit according to the fit (425 Motorsports helps race car driver, Mike Holden pick out the perfect race suit!, 2013).

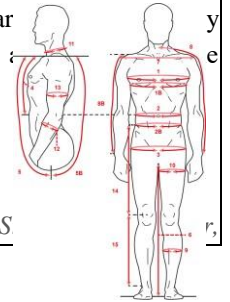


Figure 3: How to Measure from Stand21

### Product Attribute Link with Comfort

Table 5: Product attribute that's linked with comfort

Comfort as Functional Requirement	Product Attribute
Construction and Garment Technology	The construction of the suit is considered with the wearer's movement. Flat seams are used for the construction of the garment. The threads used for seams and embroidery are also fire resistant threads. With the evolution of the racer wear the construction was also thought of
Materials Used to Control the Body Temperature	Adidas has its own range with a cooling fabric technology called "climacool Nomex®" this cooling fabric stops the racer to a certain degree from dehydration. The base layer has a cooling effect.
Cool Box	Special value addition for the garment is done by many brands in order to enter the market with a USP. Some have special ventilation panels for air to penetrate in to give comfort and to control "heat stress" from occurring (Anon., 2016). Cool box is another device used by racers to cool them up while in a race made by F.A.S.T and Momo. It helps to exclude the pressure points and to control moisture away from the body. 2cool water shirt also has moisture wicking materials to keep the body at a moist state this helps to stop dehydration arising. But there is a disadvantage in this, the weight of the cool box effects the weight of the car when in the race.

## RESEARCH METHODOLOGY

Through this chapter the research methodology used to achieve the objectives is listed below. Mainly the research was based on an exploratory methodology.



To Identify the Problems Faced by the Sri Lankan Racers During an Event.

The research methodology for objective 1 was carried out to develop a clear understanding of the problems faced by racers during an event. Exploratory observation at racing track and live telecasts of racers gave a real time understanding. An exploratory questionnaire guide was forward to the racers to gather information about the difficulties they face during an event and there were 19 respondents. In order to carry out an in-depth study interview were done among 10 renowned racers, reason for this was insufficient information from the questionnaire guide.

To propose solutions to the problems identified by the Sri Lankan racers.

In line with the particular problems faced by the Sri Lankan racers, an exploratory interviews was carried out regarding the enhancement of the material with, latest advancements in active wear and technological know-  
To evaluate the possibility of developing motorsport gear in Sri Lanka

Interviews with the industry experts as well as the observation of the resources available in the current sportswear industry gave insights to the operational level strengths and weaknesses that prevails in order to develop this gear. Interview with the top management of the textile industry such as Shirendra Lawrence (COO for MAS Holdings and an International and Local Racer) helped to understand the commercial viability of launching the product in Sri Lanka. Also a local retailer was interviewed to understand the retailer's perspective of the motorsports gear.

Results and Analysis - Problems Faced By the Sri Lankan Racers during an Event and Solutions to Minimize the Problems

Safety of the Racers

Recovery effort of Muscular

Problem

Most of the time the racetrack has left bends where racer has to exert a great force in order to control to keep in track. Here the G-Force can occur and cause pressure on to the upper body. Out of 25 respondents, 15 said that they get muscle pains while driving due to the force

how in order to suit Sri Lanka. Interview was carried among 5 textile technologist and 3 technical expertise in a leading Apparel manufacturing company in Sri Lanka. And also further literature was reviewed for new products that are available in the market.

To analyze the pricing levels that suit the Sri Lankan market.

An observation study of branded and non-branded racing suits were carried out to find about different price levels for motorsport gear available internationally and locally. The cost of fabrics was given by the Merchant and also the possibility of treating the fabrics in the Sri Lankan mills was found out through interviews. A guide was acquired from the costing and Industrial Engineering team of a leading Apparel Manufacturing company to identify the cost to produce this in Sri Lanka. Interview was carried out with a scrutinizer of Sri Lankan Standard for Automobile Racing to identify if the standards are followed in Sri Lanka.

they exert. Respondents of the interview stated that they do "endurance work outs" to keep themselves physically fit. Mainly events falls on weekends, timings on Saturdays and the event on Sunday. So "recovering is very important," stated respondent 16 (2016 Sri Lanka National Supercar Champion, racer). According to some respondents, they have more than one event on the same day. So recovering and recuperating after a race is very important. As stated by respondent 2 (Podium finishes in Truck and Jeep and Subaru category), "if we get a cramp or an injury that means we have to sacrifice our next race."

## SOLUTION

Nike pro combat compression pant was suggested by textile expertise 1. As per the interview with him, the Nike pro compression pant and recovery pants can be used by a driver who has muscular or cardiovascular pain. This can be worn during and after the race for recovery. Most of the racers aren't aware about the compression pants. Recommendation would be to suggest the racers to wear compression pants after an event or before the second event for fast recovery of muscular fatigue.





Also, interview with the technical expertise suggested that, “when the compression testing machine is in-house it’s a matter of developing a design to suit the Sri Lankan racer and marketing it.” Thus developing a compression garment according to the parameters is a possible for the local racers.

### Pains and Injuries

#### Problem

Pain can arise due to various reasons, to maintain safety pains and injuries should be minimized. Identified areas of pain that the respondents emphasized were the excessive amount of discomfort encountered above the chest. This is due to the headgear bumping on the roller cage which is of metal. Even the force a racer experience while braking is mostly affected to the neck area.

#### Problem



Figure 4: How heat stress can occur

Out of 25 respondents from interviews/questionnaire, 21 emphasized it is “extremely hot” when worn. Respondent number 1 ( SL-H Subaru Legacy 2000cc Category, 2013 & 2014 Championships) said that,

*“It feels like we are bundled up in winter clothing during summer”*

The reason for this is that the weather condition in Sri Lanka is very humid and the temperature ranges from 27°C – 34°C. Events are scheduled from March – November which include the warmer periods. Also, the tracks are located in high- temperature areas except for the events held in Nuwara Eliya Road Race and Fox Hill. As respondent 1 stated, “therefore there is a tendency for cramps occurring.” However since the time of a race is considerably shorter than that of other countries no

respondent recorded a cramp due to heat stress, but only the fact that heat stress is there it creates an uncomfortable situation during the time frame racers are wearing it. Most of the respondents emphasized that the suit is “excessively heavy”. As stated by respondent

### Solution

According to exploratory interviews, the main area of safety is the neck. HANS device is used by international racers to prevent themselves from dangerous injuries. But this device is not affordable by the Sri Lankan racers.

As suggested by textile experts a light weight spacer can be used for safety and comfort instead of HANS device. Although the light spacer appears to be bulky it has respectable amount of breathability. So the racer would feel more comfortable and the neck would also be protected to a certain extent.

### Comfortability of the Racers

### Heat Stress

19 (CEAT 2016, Sri Lanka Super Series Championship for CEAT Champions), “it’s a 3 layer suit that is why it is excessively heavy and hot as air doesn’t penetrate in.”

The heat generated by the engine can enter inside and make an intolerable environment. Respondent 16 (Marketing Manager of ACBT and Racer for Nissan March 1000), emphasized that, “it’s a great disadvantage to have air-conditioning or to open shutters”. In Sri Lanka, the temperature inside the car could rise up to 45°C or more depending on the climate of the event ground. As to Dilantha Malagamuwa (International Racer, Lancer Evo Category), he stated that in international races the temperature rises up to 60°C -65°C. “In Dubai last 3 rounds (15 min) I felt faintish but yet I manage to endure it and finish the race.”

As stated by respondent 16 “I use to pour water over my neck before a race to stop me from dehydration.” Many respondents emphasized that they “drink more water or energy drinks” before the event and also they take “ice cubes”. Dehydration cause tunnel vision where the racer can go out of control. Vision is important because; the racer has to keep in the right path, keep communicate with crew, look at the speedometers and lastly to do calculations to maintain the speed so that no one would be able to surpass. So the racer must be physically fit and mentally strong to perform all these.

Excess moisture can also cause the suit to become heavy. “Push-pull” fabrics which has hydrophobic material inside and hydrophilic material outside (Anon., 2016) helps to keep the skin dry.

Also the “Coolcore” fabric which is a patented [PATENT 9,121,642] (coolcore, 2015) product can be used as a layer on the suit.

Respondent 13 (Rally and Race car driver) emphasized that, the cool box is not used by the local racers, this is due to the price been unaffordable. In order to satisfy

### Solution

Using cooling fabrics such as ‘Nike Pro Hypercool’ and ‘Nike Pro Cool’ could retain the body temperature and wick moisture to speed up evaporation (NIKE, n.d.). This fabric when added to the base layer will prevent body heat from rising and control the body temperature with the temperature inside the car for a relative period. There are different cooling fabrics such as “Cool Jade 2.0” [patented No. 1350873] and NILIT breeze (Breeze, 2016) which has instant sense of cooling and lasting refreshed sensation. Below figure (5) shows fabrics suggested by textile experts at MAS Bodyline.

These fabrics can be inserted according to the design preference and to places where most sweat is generated

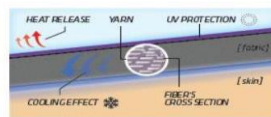


Figure 4.12: NILIT Breeze cooling effect (Breeze, 2016)



Figure 4.12: Single jersey 85% N66 Nilit Breeze 15% spandex



Figure 4.12: Jacquard 54% Poly 46% Polyester



Figure 4.12: Jacquard 53% Poly 47% Polyester



the Sri Lankan racers, an enhancement to the fabric was suggested by textile expertise 2 (Material team, New Balance) that is, incorporating water repellent layer instead of padding. Mainly by using a fabric like water mattress can be used to insert a thin weightless

water layer. As suggested water panels can be added to areas with less movement, such as the stomach area. A leading adhesive company in Sri Lanka uses bonding techniques to composite different fabrics; using a breathable adhesive with a membrane that is water resistant and tapes which meets FR requirements



(Logic, n.d.). This method could support to control the body temperature and contain the loss of hydration. The air cot sheet for babies can also be used but instead of oxygen, this could be used to hold a small amount of water or air that would not cause the fire to upsurge.

Results And Analysis - Evaluation Of The Possibilities Of Developing The Proposed Product In Sri Lanka Within The Affordable Price Range Of The Sri Lankan Consumer.

Evaluation of the price level of the proposed product

Affordable price level of the Sri Lankan racer

After an in-depth observation about the pricing levels of the motorsport gear in the market, it was observed that the global price ranged from \$150-\$2000 or more including shipping charges. Respondent 14, stated that “I had to go to Dubai to buy a decent suit”. 14 respondents out of 19 preferred OMP and Sparco, which are the most renowned international brands. Most of the respondents use karting suits instead of the motor racing suit because they are affordable. As one respondent said, “When we have to tolerate the cost of

Figure 7: Design idea to support the solution



repair, we do not have the budget to think of the premium suits.” Even Scrutniger stated: “We do not check the standards of the racing gear in Sri Lanka, even though it’s mentioned in the regulations. Because not everyone are capable of purchasing it with all the expenses they have to tolerate.”

Pricing of the proposed product

As a solution to this problem costing for the proposed garment was done with the assistance of the costing and merchandizing team of the leading apparel manufacturing company. The prices of the materials of the original fabrics and the prices of the materials of the suggested fabrics were taken into consideration. With the suggested fabrics the cost appeared relatively low. Costing for the proposed garment is shown below

Table 6: Costing sheet including FOB

Total materials	\$ 25.99
Total trims	\$5.73
Charges , fabrics	\$-
Charges , trims	\$-
Packaging	\$2.48
Other costs	\$-
CMP	\$8.73
Discount	\$-
<b>FOB \$42.93</b>	
<b>Manufacturing cost (assuming USD is 155rs)</b>	<b>6,654</b>
<b>Mark up 75% / Selling price to Middle</b>	<b>11,645</b>
<b>Market Selling Price</b>	<b>20,000</b>

The Free on Board (FOB) for this racing gear would be \$42.93. This includes Standard Minute Value (SMV) into Charge out rate in other words Cost per Minute (CPM) which calculates to Cut and Make Price (CMP). The proposed garment could be sold for Market Retail Price of \$96 - \$129.

Evaluation of the manufacturing capabilities in Sri Lanka

Most of the respondents interviewed emphasized whether this proposed outfit could be manufactured in Sri Lanka. According to local retailer interviewed (CEO of CR Racing Gear importer of motorsport gear from Pakistan and racer), he emphasized that, if Sri Lanka has the possibility to produce then it would be favorable for the drivers to buy locally, according to their requirement and aesthetic aspects. The products we retail are not



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branded or FIA/SFI approved but their appearance is the same as the branded ones, and they place the brand logo of your preference. These racing kits would cost Rs15,000.

Textile expertise, Manager of a leading apparel manufacturing company, and also Shirendra Lawrence, echoed the same sentiments as they suggested their ideas towards this end. The biggest challenge that Lawrence

emphasized was, “whether it would be possible to get FIA” standards.

As to Shirendra “I think it would be possible to get certified in Sri Lanka to make custom made overalls when you are using the best materials.” The only cost that would affect the market price would be the cost for FIA approval. In order to evaluate the strengths and weaknesses of the Sri Lankan industry, 5M analysis was carried out and the results are provided in table(7).

Table 7: 5M's Efficiency

<b>Manpower</b>	Shirendra stated that, “in anywhere in the world the labour cost is not so less than the materials may be its 40-50% of the materials and the rest is the labour cost,” therefore the local labour cost is relatively low than that of the European labour cost. Also the skill level of the labour force is far more standard than that of the other European countries. As observed the skill competency of each labour is verified
<b>Materials</b>	The material finishing could be done locally said textile expertise and also the Fabric technologist emphasized that the suppliers are well known with the local industry so the possibilities of ordering
<b>Machines</b>	Machinery and technology available in Sri Lanka apparel manufacturing companies have the capacity to produce this. With the capability of quality tailoring could cater without looking at the FIA approval. Finishing techniques could be done using bonding or flat seam method because the machines are readily
<b>Methods</b>	There will not be a high-end market but a market would be open for the locals, said Shirendra. It would
	possible to cater to an Asian market, but then brand loyalty comes in to play with the best brands already operating in the market, so there is a potential threat for a new brand to penetrate. Lawrence emphasized that “there is a big opportunity for even someone in Sri Lanka like a small scale manufacturer, could be a chance for best tailoring retailer, to produce this locally.” Some well know tailoring bands have the
<b>Money</b>	As mentioned above about the FOB this product could be sold at market retail price of Rs15, 000-20,000 which would be a profit for the manufacture. Even the cost for other factors are fairly less. So

SWOT Analysis in developing this in Sri Lanka.

Table 8: SWOT Analysis

<b>Strengths</b>	<b>Weaknesses</b>
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<p>Availability of fabric mills in Sri Lanka.</p> <p>Availability of well renowned apparel manufacturing companies that are capable of sewing and finishing heavy materials.</p> <p>For small scale manufacturers to market their brand locally and globally.</p> <p>Labour skill</p> <p>Low labour cost</p> <p>In house machinery availability.</p> <p>Availability of fabric finishing methods.</p> <p>Engines and fuel used are not as powerful as those used in</p>	<p>Unavailability of special labs to check the standard and quality of the garment.</p> <p>As it would be a custom fit the cost could be high.</p> <p>FIA standards would have to be obtained and the cost of that would be high as well as the process.</p> <p>The cost of Nomex fabric as it is not available in Sri Lanka.</p>
<p><b>Opportunity</b></p>	<p><b>Threats</b></p>
<p>As FIA standards are strictly checked focusing more on comfort and safety</p> <p>Availability of technology and innovation centers that would allow new ideas.</p> <p>Number of racers and events increasing</p> <p>More sponsorship for racers can be directed to the making of the suit.</p> <p>Opportunity to show that Sri Lanka is capable of creating motorsport gear.</p>	<p>Pakistan been able to produce the same racing gear without any standards.</p> <p>In case of a sudden fire the driver is at risk as it is made without standards.</p> <p>Entry in to the market of motorsport is hard with the current existing brands internationally.</p> <p>If FIA standards are a must have for Sri Lankan racers. It would be a threat to the market entry.</p>

## DISCUSSIONS FINDINGS

According to the above analysis, there is evidence that shows Sri Lankan racers face many difficulties as opposed to the international racers. Whether the Sri Lankan racers are aware of the standards of the suit and that it should be FIA/SFI approved, most of the racers aren't wearing the right suit. Whether the respondents said they are wearing the approved gear they are wearing the Karting gear, which is not applicable.

The analysis provides that most of the racers felt dehydrated and there was a tendency for cramps to occur. Whether they were physically and mentally

strong, due to the humidity and the heavy suit heat stress could occur. Also, racing suits not been available in the local market and the racers having to purchase it from abroad. These were some of the problems faced by the racers in Sri Lanka.

When looking at all the evidence gathered there is a need to enhance the fabrication of motorsport gear in Sri Lanka. Evidence received for solutions suggest that this could be done with a low cost and by enhanced fabrication. Altering the design of the suit according to the functional aspect as well as aesthetic aspect would help to enhance the fabric while solving the problems the racer's face.



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Through the solutions received by the textile experts and industrial heads, it was identified that the problems could be solved within a Sri Lankan context. Even the comfort and safety but they tend to look to the price factor as well. It was also identified that the proposed product can be made within the budget of the Sri Lankan racers. The possibility of producing this suit was analyzed using a SWOT analysis and identified that this product can come to life in Sri Lanka to suit specific needs of the racer. As further discussed with Shirendra Lawrence there is a possibility to produce this in Sri Lanka with a favorable sponsorship.

However without considering the FIA standards and penetrating to the international market, producing an outfit that is safe and comfortable could be manufactured for the local racers. As per feedback received by the drivers for the proposed racing gear most of the respondents said, "We are willing to buy if it's at a low cost." But some of the respondents emphasized that they would by "branded" and "FIA" approved suit rather than putting themselves "in danger". Mostly this proposed gear could be an entry level outfit rather than a top of the line outfit.

#### Conclusion and Recommendation

This research focused on a problem that the Sri Lankan motor racers face during an event and how it could be solved through textile and clothing technology in Sri Lanka. The exploratory research carried out giving insights to the problems faced by the racers in Sri Lanka due to their outfit not been accustomed to the Sri Lankan climate and humidity.

Through this research, it is proven that there exists a need to improve motorsports gear according to the Sri Lankan racers requirements. Availability of fabrics and also to enhance the gear according to the problems faced can be done within the Sri Lankan context. It also proves that there is a possibility for a product line to enter the Sri Lankan market with a favorable price range while considering the functional, aesthetic and fitting aspects.

The research concentrated on the Sri Lankan context with respondents from the local and international arena providing data. There are similarities in the problems faced by both the racers. So enhancing the fabrication

chemical finishes could be done within the textile mills. The racer not only looks at

of motorsports gear is an essential factor when considering the safety and comfort of the racer.

Further research on this area was also identified. The respondents claim that their head knocks on the roller cage. Which is a disadvantage to them while on the race. Internationally they use the HANS device to safeguard the head and the neck during the race but most of the racers aren't using this device locally. For further development, a new head gear can be looked into.

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