

Is bamboo fabric considered a sustainable textile?

Secondary Research Report  
ADHP 5701 Research Methods

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Aims: To find and evidence if bamboo is a sustainable fibre regarding textiles.

Objectives:

- To evaluate what a sustainable fibre is?
- To conduct valid research on the production of the bamboo fibre.
- To conclude my findings and evaluate the outcome and solution.

## Introduction

The purpose of this study is to evaluate how or if the bamboo fibre is sustainable regarding textile use. The fibre is the base component for textiles. A fibre is a hair-like strand, where multiple strands are combined to make a yarn or fabric. (Baugh,2011). To be sustainable the fibre would have to be maintained at a certain rate or level (Oxford Dictionary,2017) considering the environment and ethical practices. For this study, the focus is the environment. Bamboo growing is suggested to be sustainable (Copeland, 2010) and brands are advertising the whole bamboo fibre as an environmentally sustainable fabric (Positive Outlook,2017). However, Copeland (2010) suggest fabric made from bamboo is more controversial than the growing of bamboo.

This report is important to the textile industry as in the documenting film *The True Cost* (2015) states we cannot afford to not be sustainable because of the polluting effects its having on our world. The textile industry is the second most polluting industry in the world (Sweeny,2015).

Secondary researched started in search of books. Information regarding defining sustainable textiles and uses were found. However there was lack of research on current information regarding bamboo and sustainability within the textile industry. The possible reason for this could suggest the controversial debate that will be discussed in the text on the technically correct term of bamboo fabric. Further methods included journals, newspaper articles, blogs, recent documenting films and current online brands. Context will include current brands that use bamboo fibre in their textiles and how they believe it is sustainable for the environment. Positive Outlook (2017) and Bam Bamboo Clothing (2017) both build their brands on the claims of benefits of the bamboo textile. Research will be taken to either support or deflect the findings of these brands. The article will move on to a deflecting company whose ethos is based on sustainability Patagonia and why they are not prepared to use the bamboo fibre. Again, further research will be taken from other sources to support or contrast the findings and debate the case study. The study will then conclude its findings and recommendations.

## The Debate

Positive Outlook (2017) is a clothing brand that use the bamboo fabric within their garments. Their main ethos, which are morals they want to stand for are to be sustainable and ethical within their brand. They mention how they use bamboo based on its 'minimal impact on the environment' and the fabrics benefits. These benefits are claimed as being soft, anti-bacterial, unlikely to cause allergic reactions

and breathable. Further looking into Positive Outlook, would suggest they are quite genuine with wanting to be sustainable as other materials include organic cotton. They seem to be passionate about their goal by wanting to give a positive impact on the world when referring to their website. Copeland (2010) an environmental material developer and manager from Patagonia, a company that will be explored later in the article states similar benefits as Positive Outlook (2017) and more. It suggests that the bamboo plant is fast growing, as much that it is the fastest growing plant in the world. The plant is suggested it needs no chemicals to grow and the fibre produced from it is soft. Within academic books bamboo growing and plant is supported to be fast growing, little use of chemicals such as pesticides needed, the soil can improve soil rather than deplete unlike cotton and is not easily effected by bacteria (Gordon and Hill 2015).

However, though evidence suggests the growing of bamboo is sustainable, the processing of the plant into a fibre is a more controversial matter. In a text that supports the benefits of bamboo as a plant and its growing, problems with the bamboo fabric are raised (Gordon and Hill,2015). The bamboo fabric is suggested to be soft natured because it is fundamentally rayon (Copeland,2010 and ‘Gordon and Hill, 2015). Rayon is a regenerated fibre made from extracted wood pulp or plant based material then processed through chemicals to produce fibres that can be spun into a fabric (Barn Hard Cotton, 2015). This is not a natural fibre. The process of rayon is polluting and takes up a lot of energy (Copeland,2010 and ‘Gordon and Hill, 2015). Looking at figure 1 the rayon process is exemplified in a lengthy process that backs up the above statements.

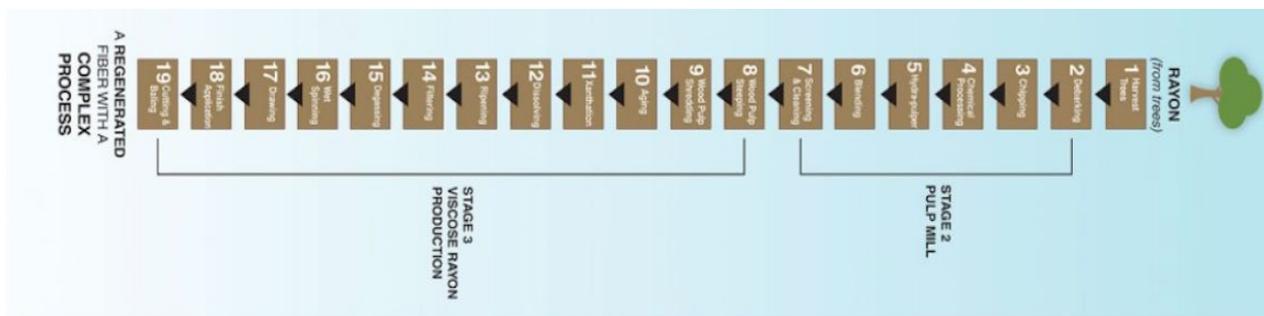


Figure 1- 'Barn Hard Cotton, 2015'

Patagonia’s Todd Copeland (2012) also wrote an article on the matter of bamboo fabric regarding its benefits and not so beneficial process. Patagonia during the 1990s was one of the first apparel companies to start the lead in sustainability (Muthu,2015). The company aims to inspire others to work in a similar way, and has become a pioneer within the environmental and social fronts since its beginning (Muthu,2015). Examples of this include; ‘Using only Organic Cotton since 1996’ and ‘One of the first outdoor companies in the U.S to introduce Fair Trade certification’ (Muthu,2015). This factual information from Muthu (2015) suggests Patagonia is a reliable source within the sustainable industry.

Fast growing of bamboo and little use of chemicals such as fertilisers are confirmed (Copeland,2012). The growing can be considered sustainable apart from the

concerns on suspected effects on wildlife such as Panda's and their habitat because of depleting natural bamboo areas. This notion has also been supported by an environmental correspondent (Brown,2004). Decreasing in population and worries of extinction has been mentioned due to forest destruction which was suggested to be sourced from the World Conservation Monitoring Centre in Cambridge. Pandas are still seen to be at risk even with nature reserves set up for them because of illegal logging and agriculture for bamboo (Laidler,2003). As this breaks up the bamboo area it leaves fragments; which results in Panda's not being able to breed successfully. This suggests the depletion in the Panda population, though newspaper articles from over 10 years ago are not necessarily accurate for the present. Therefore, researching further World Wide Fund For Nature(WWF,2017) confirm the loss of habitat and fragmentation is one of the main factors causing threat to Pandas (WWF,2017). Though regarding an ethical and sustainable fibre this would be based on where and how the bamboo was grown or taken from.

However, the reason for this article written by Copeland (2012) is to explain and show why they don't use bamboo fabrics. This is because of the process the bamboo has to go through to become a fabric as talked about earlier in the study by Gordon and Hill (2015) and Copeland (2012). The reason for not using the fabric is because of the most common process of bamboo to fibre being rayon or viscose rayon and other processes not being easily available. This is suggested to be because of the other processes being more highly priced and longer to produce (Smith,2017). Resulting in companies that want to use 'bamboo' are more likely to use the viscose rayon method of processing. Rayon is described as using a cellulose material, which is plant based and in this case the bamboo (Copeland,2012). Which is then dissolved into strong chemicals. This includes harmful chemicals that can pollute our environment and endanger people. As agreeing with Smith (2017), 'Patagonia' has been researching the bamboo fabric for over 14 years and they will not use the fabric as the most available is the viscose rayon method (Copeland,2012). The viscose rayon process is also supported by Donatelli (2013), with a Masters in Ecology and Bachelor Degree in Globalization and Environment Science. It is explained how fabric using this process cannot claim the fabric to be made by bamboo (Donatelli,2013). As the bamboo cellulose goes through a chemicals process it makes it man made Fasanella (2009). Therefore, it should be called rayon or at the very last resort rayon made from bamboo. Companies that are using this process should be labelling their clothing as rayon and not bamboo fabric. Looking at figure 2 the Class A group is aimed at being the fabric with the least negative effect on the environment and Class E having the most negative effect on the environment (Brown and Williams,2013). Bamboo viscose and rayon which are predominately the same thing suggested by above research are both in 'Class E'. This suggests rayon or bamboo viscose is not environmentally friendly (Brown and Williams,2013).

CLASS A	CLASS B	CLASS C	CLASS D	CLASS E	UNCLASSIFIED
Mechanically Recycled Nylon	Chemically Recycled Nylon	Conventional Flax (Linen)	Modal® (Lenzing Viscose Product)	Bamboo Viscose	Acetate
Mechanically Recycled Polyester	Chemically Recycled Polyester	Conventional Hemp	Poly-acrylic	Conventional Cotton	Alpaca Wool
Organic Flax (Linen)	CRAILAR® Flax	PLA	Virgin Polyester	Cuprammonium Rayon	Cashmere Wool
Organic Hemp	In Conversion Cotton	Ramie		Generic Viscose	Leather
Recycled Cotton	Monocel® (Bamboo Lyocell Product)			Rayon	Mohair Wool
Recycled Wool	Organic Cotton			Spandex (Elastane)	Natural Bamboo
	TENCEL® (Lenzing Lyocell Product)			Virgin Nylon	Organic Wool
				Wool	Silk
More Sustainable				Less Sustainable	

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**bwe** This Benchmark was made in cooperation with Brown and Wilmanns Environmental, LLC. For further information on this Benchmark see [www.made-by.org/benchmarks](http://www.made-by.org/benchmarks)

Figure 2 'Brown and Williams, 2013'

Looking at Figure 2 would suggest it may not be correct to advertise textiles in this category as 'minimal impact on the environment' as told by Positive Outlook (2017) (Brown and Williams,2013). Which refers back to why companies should not be labelling their products as 'bamboo' as it is not technically correct (Donatelli,2013).

The Federal Trade Commission (FTC) is an organization in the United States (U.S) that works to protect customers from businesses; such as ones that make false claims (Katz,2009). In the U.S four clothing companies have been charged for advertising their textiles as made from bamboo when it is essentially rayon (Katz,2009 and told by Donatelli,2013). The FTC charged the companies on deceptively labeling and branding these textiles (Katz,2009). This was also reported in Canada (Fasanella,2009'). The report was taken further by explaining why man-made fibres like rayon cannot be labelled by the natural cellulose like bamboo that it is based on. Otherwise as explained earlier in the study it may have to contain the chemical ingredients also (Barn Hard Cotton, 2015). According to reports no man-made fabrics are labelled this way, which is also evident by looking at clothing labels (Fasanella,2009). For example, polyester is not labelled as petroleum and rayon is not ever labelled as wood cellulose. Therefore, why should rayon that used bamboo cellulose and not wood cellulose be labelled as bamboo?

Greenpeace (2016) have produced a campaign where clothing brands have to detox by 2020. The brands have to complete 3 aims to detox; managing harmful chemicals and attempting to eliminate them, being transparent in showing public data on uses and discharging chemicals and to completely eliminate the poly fluorinated chemicals known as PFC's. Greenpeace are a worldwide corporation that invest, expose and confront abuse within the environment and attempt solutions to protect the natural world. Taking Greenpeace campaign further being transparent in labelling could be suggested. This would also show the process that is being used, which evident the chemicals. This is also important as statistics show only 50% of

chemicals used in the viscose rayon process are re used; which meant the other 50% is put into the environment (Copeland,2012). Alternative processes such as the lyocell which has a much better impact on the environment than rayon (see figure 2, Brown and Williams 2013). Lyocell is an improved system with a closed loop process where majority of non-toxin chemicals are recycled. This process also has to label their textiles as lyocell and not from the cellulose such as bamboo (Fasanella,2009). So why are companies such as 'Positive Outlook,2017' and 'BAM Bamboo Clothing' labelling their textiles as 'bamboo'?



Figure 3 'Positive Outlook,2017'

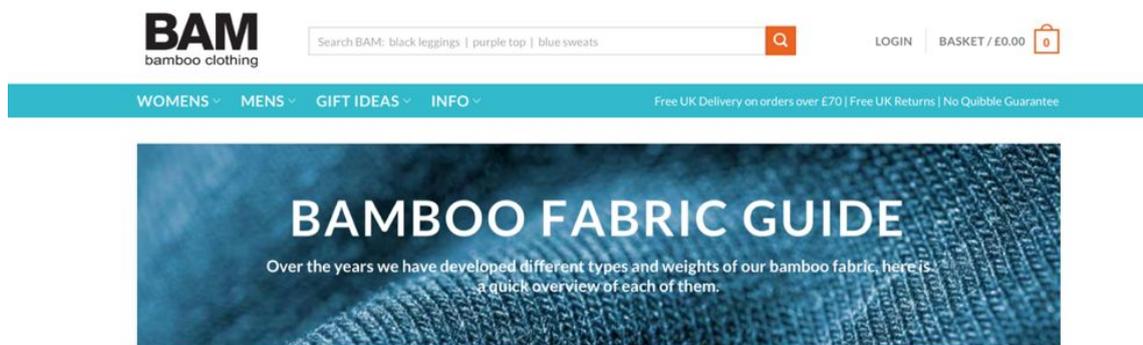


Figure 4 'BAM Bamboo Clothing,2017'

Looking at figure 3 and figure 4 both companies have labelled it as bamboo clothing or bamboo fabric and looking at figure 1 it is even included on the packaging as '65% bamboo'. So why is lycra not labelled as polyurethane, its base ingredient (Romanowsk,2008)? The FTC have also charged four brands by claiming the process that has been used is good for the environment which from all evidence here suggest is not the case at all (Fasanella,2009). Which again shows examples of miss-leading their customers to think they are buying into environmentally friendly goods.

From figure 3 Positive Outlook (2017) quote they 'chose to use bamboo due to its minimal impact on the environment'. Using the word minimal could mean they could get away with the claim of little impact on the environment as minimal has no definitive number or amount (Oxford Dictionary,2017). BAM Bamboo Clothing (2017) use another technique see figure 5. The brand claim bamboo is great for the environment and list the positive impacts it has on their website (Figure 5, BAM Bamboo Clothing,2017). The majority of the information they have provided may be correct for the bamboo plant (Gordon and Hill, 2015' and 'Copeland 2012). However, this just covers the growing of the bamboo and not the process the bamboo goes through to create their textiles. The question that stands is it fair to consumers to firstly label rayon textiles as bamboo and is it fair to insinuate its benefits from the growing stage as the whole package? From looking at The FTC laws on this as stated earlier in the study would suggest that claims such as figure 5 by BAM Bamboo Clothing should be accurately labeling its claims from what stage in the process these benefits are referring to (Katz,2009). This again links back to being transparency within the whole process of the textiles being used (Greenpeace,2017). Which could indicate brands being honest about the whole process as BAM Bamboo Clothing and Positive Outlook are seemed to be misleading to the public eye.



Figure 5 'BAM Bamboo Clothing,2017'

Though both of these brands mentioned perceive themselves as genuine within their ethos for good impacts on the world it is likely their soft un-technically named bamboo fabric is rayon (Copeland 2012 and Positive Outlook 2017). Which could lead back to companies needing to be more transparent when using chemicals and how a material after processing is not necessarily the same (Greenpeace,2016).

### What does this tell

Conducting this study shows initial growing of the bamboo plant is regarded as sustainable (Gordon and Hill 2015, Copeland 2012, Donatelli 2013). Though in some cases it may not be as it can have an impact on the Giant Panda population dependent on where growing and harvest is taken place (Copeland 2010, Brown

2004, Laidler 2003, WWF 2017). Further research should be conducted regarding animals effected by the growing of bamboo.

A bamboo fabric is not considered a technically correct term as any textiles that use bamboo as its base fibre, use a process so that's its able to be used as a textile fibre (Fasanella 2009, Copeland 2012, Donatelli 2013, Gordon and Hill 2015). Which Fasanella (2009) confirms makes it a man-made fabric. The most popular and accessible process is rayon (Smith 2017 and Copeland 2012). The rayon process uses the cellulose from a plant. This is most commonly wood but in this case bamboo and processes it using harmful chemicals to be become a solid fibre (Copeland 2012). The environmental and sustainable claims regarding bamboo fabric (Positive Outlook 2017) correctly named rayon are more conclusive not be a sustainable fibre or textile. Beneficial claims such as being anti-bacterial can be seen as correct for the bamboo plant but inaccurate for a cellulose that's been processed by further chemicals (Copeland,2012). Rayon or viscose bamboo has the most negative effects on the environment referring to figure 2 as a Class E fibre being the least sustainable on the environment (Brown and Williams,2013). Greenpeace (2016) would encourage such practice involving hazardous chemicals to the environment to be minimalised or eliminated.

As the study went on to complete the main aim of discovery of the bamboo fibre which is rayon not being sustainable, a further problematic finding revealed. Bamboo fibre or bamboo fabric is not correct as explained above (Fasanella 2009, Copeland 2012, Donatelli 2013, Gordon and Hill 2015). However, the more concerning issue of the matter is that companies are labelling and advertising rayon as bamboo fabric and that its environmentally approved (Positive Outlook 2017 and BAM Bamboo Clothing). Companies in the U.S that are calling the rayon fabric by its base fibre such as bamboo are being charged for violating labelling requirements by doing such a thing (Katz,2009 and told by Fasanella). It has been implied brands need to become transparent to the public and customers about their textiles (Greenpeace,2016).

To conclude growing of bamboo can be considered as sustainable in most circumstances. The process however cannot be considered sustainable because of its chemical effect on the environment and people. The labelling of a bamboo fabric is inaccurate and misleads costumers and insinuating claims that the fabric is environmentally sustainable is also assumed incorrect.

## Conclusion

From this what has been learned is that Positive Outlook(2017) and BAM Bamboo Clothing(2017) are most likely using the rayon process. As the base cellulose is bamboo they believe they can advertise and label the fabric as bamboo. This could indicate lack of research within their key area of interest and ethos, being the so called bamboo or the sustainable fabric they claim it is. They seem to use lack of knowledge within their audience to suggest incorrect assumptions. Positive Outlook

and BAM Bamboo Clothing need to either be aware of the process their textiles go through and they need to become more transparent within their labelling as suggested by Greenpeace (2016). Stricter laws such as ones in the U.S used by the FTC should be used regarding labelling clothing correctly to protect customers from misleading promises and false naming fabrics (Katz,2009). This would also force the two brands to conduct research within what materials they are using to choose a better match to their advertising brand. Positive Outlook (2017) has set an inspiring ethos to be sustainable it should be shown in the process of the fabric. Using rayon is understanding to not be sustainable and damaging to the environment (Copeland,2012). For companies that pride themselves on such a material and have spent years in its focus, it could be possible they are aware of the un-sustainable process their bamboo fabric called rayon goes through. It could suggest clever marketing aiming at individuals that are unaware of this controversial fabric.

Rayon processed fabric should not be able to be labelled as bamboo and also claim its environmentally friendly because of the cellulose it uses (Donatelli 2013). Unless proved otherwise bamboo into a textile fabric uses a chemical process whether it is the most popular rayon or lyocell and therefore is suggested as man-made (Fasanella 2009). It is unfair for customers to be told otherwise, especially if it is in their belief they are being sustainable. To relate, if a person were to purchase organic labelled food they wouldn't expect just the growing to be organic. A person would assume that no chemicals were used after as that is what they want to buy into and consume. So why should it be any different with clothing? This is potentially because laws could allow companies to claim sustainability on 30% of the textile such as the growing. Further action needs to take place as suggested earlier in the conclusion with laws and regulations in the textile industry regarding labelling and advertising with transparency (Greenpeace 2016). Furthermore using the rayon method involves hazardous chemicals (Copeland,2012). Which associations such as Greenpeace (2016) suggest would be interested in aiming to eliminating the chemicals. Greenpeace are already looking to make clothing brands become more transparent and eliminate chemicals could be the place to start to progress such laws within labelling also.

Evidence throughout this article would prove if sustainability is key purchasing rayon or false fabrics such as bamboo are something to avoid (Copeland,2012 and Fasanella,2009). Alternatives should be looked into referring to figure 2 and further reading from well supported companies like Patagonia as starting points (Muthu,20).

For further reading on bamboo in textiles and sustainable textiles within the industry please see recommendations list.

## Recommendations

- The True Cost. (2015) [Documenting Film] Directed by Andrew Morgan. Place of production. UK: Life Is My Movie Entertainment.

- Patagonia (2017) [Weblog] The Cleanest Line. Available from <https://www.patagonia.com/blog/> [Accessed 15/11/17]
- KAY.R (2017) Viscose Vs. Modal Vs. Lyocell-Difference? Robert Owen Undershirts. [Online] 30<sup>th</sup> April <https://www.undershirts.co.uk/blogs/research/viscose-vs-modal-vs-lyocell> [10/12/17]
- GREENPEACE (2016). Greenpeace - The Detox Catwalk. Available from <http://www.greenpeace.org/international/en/campaigns/detox/fashion/detox-catwalk/> [Accessed 12/11/17]
- MUTHU.S (2015) Roadmap to Sustainable Textiles and Clothing-Regulatory Aspects and Sustainability Standards of Textiles and the Clothing Supply Chain. Singapore by Springer.
- GORDON.F and HILL.C (2015) Sustainable Fashion-Past, present and future. London UK, Bloomsbury Academic.

## Bibliography

BAM Bamboo Clothing,2017. Established 2005, David Gordon. Available from <https://bambooclothing.co.uk/about/> [Accessed 02/12/17]

BAUG.G (2011) The fashion designer's textile directory: [a guide to fabrics' properties, characteristics, and garment-design potential]. Hauppauge New York: Barron's. p.26-27

BROWN.P (2004)- Environment Correspondent. Bamboo species at risk of extinction. The Guardian, Environment. [Online] 11<sup>th</sup> May Available from: <https://www.theguardian.com/society/2004/may/11/environment.environment> [15/10/17]

BROWN AND WILLIAMS (2013) Environmental LLC. Made-by, Environmental benchmark for fibers. Available from <http://www.made-by.org/consultancy/tools/environmental/> [Accessed 15/11/17]

COPELAND.T (2010) Patagonia. How Eco Friendly Is Bamboo, Really? Available from <https://inhabitat.com/ecouterre/how-eco-friendly-is-bamboo-fabric-really/> [Accessed 20/10/17]

COPELAND.T (2012) Claim it-There is no green wetsuit. [Source: On Bamboo and Rayon (PDF) from The Footprint Chronicles [Weblog] The Cleanest Line- Patagonia Official Blog. 10th January. Available from: <https://www.patagonia.com/blog/2012/01/claim-it-there-is-no-green-wetsuit/> [Accessed 10/11/17]

DONATELLI.J (2013) Is Bamboo Fabric an Sustainable Textile Fraud? The Textile Test Series Investigates [Weblog] Eco Chick. 8th July. Available from

<http---eco-chick.com-2013-07-28693-is-bamboo-fabric-an-eco-textile-fraud-the-textile-test-series-investigates-> [Accessed 02/11/17]

GREENPEACE (2017) Greenpeace. Available from <https://www.greenpeace.org.uk/what-we-do/> [Accessed 07/12/17]

GREENPEACE (2016). Greenpeace - The Detox Catwalk. Available from <http://www.greenpeace.org/international/en/campaigns/detox/fashion/detox-catwalk/> [Accessed 12/11/17]

GORDON.F and HILL.C (2015) Sustainable Fashion-Past, present and future. London UK, Bloomsbury Academic. p.73-74

FASANELLA.K (2009) Fashion-Incubator. How to avoid trouble if using bamboo fabrics.[Online] 18<sup>th</sup> August. Available from <http://fashion-incubator.com/how-to-avoid-trouble-if-using-bamboo-fabrics/> [Accessed 01/12/17]

LAIDLER K (2003) The bear's necessity. Can bamboo save the world? Environment. The Guardian.[Online] 20<sup>th</sup> May Available from: <https://www.theguardian.com/environment/2003/mar/20/research.science> [15/10/17]

MITCHELL J. KATZ (2009) Office of Public Affairs, Federal Trade Commission. FTC Charges Companies with 'Bamboo-zling' Consumers with False Product Claims-Bamboo-based Textiles, Actually Made of Rayon, Are Not Antimicrobial, made in an Environmentally Friendly Manner, or Biodegradable. Available from <https://www.ftc.gov/news-events/press-releases/2009/08/ftc-charges-companies-bamboo-zling-consumers-false-product-claims> [Accessed 01/12/17]

MUTHU.S (2015) Roadmap to Sustainable Textiles and Clothing-Regulatory Aspects and Sustainability Standards of Textiles and the Clothing Supply Chain. Singapore by Springer. p.119

OXFORD UNIVERSITY PRESS (2017) Oxford Dictionary,2017. Sustainability definition. Available from <https://en.oxforddictionaries.com/definition/sustainability> [Accessed 20/11/17]

OXFORD UNIVERSITY PRESS (2017) Oxford Dictionary. Minimal definition. Available from <https://en.oxforddictionaries.com/definition/minimal> [Accessed 02/12/17]

POSITIVE OUTLOOK (2017) Positive Outlook. Available from <https://www.positiveoutlookclothing.com/#hpabout> [Accessed 15/11/17]

ROMANOWSKI.P (2008) Made How. Eco Watch [Online] Vol. 4. Available from <http://www.madehow.com/Volume-4/Spandex.html> [Accessed 01/12/17]

SWEENY.G,2015. Eco Watch. [Online] 17<sup>th</sup> August. Available from <https://www.ecowatch.com/fast-fashion-is-the-second-dirtiest-industry-in-the-world-next-to-big--1882083445.html> [Accessed 02/12/17]

SMITH.E (2017) Material selection Innovative Finishes and Technologies, from MDTI5001 Design, innovation and Sustainability. De Montfort University, Leicester. 21<sup>st</sup> November 2017. Available from: Blackboard [21/11/17].

The True Cost. (2015) [Documenting Film] Directed by Andrew Morgan. Place of production. UK: Life Is My Movie Entertainment.

UNKNOWN AUTHOR (2015) Barn Hard Cotton. Know your fibres: Cotton Vs Viscose Rayon. Published 2013 and updated 2015. 19<sup>th</sup> August [Online] Available from <https://www.barnhardtcotton.net/blog/know-fibers-cotton-vs-viscose-rayon/>, [Accessed 25/11/17]

WWF (2017) WWF. Giant Panda-threats, Habitat loss and fragmentation. Available from [http://wwf.panda.org/what\\_we\\_do/endangered\\_species/giant\\_panda/problems/](http://wwf.panda.org/what_we_do/endangered_species/giant_panda/problems/) [Accessed 15/10/17]

### Images

Figure 1- UNKNOWN AUTHOR (2015). Barn Hard Cotton. Know your fibres: Cotton Vs Viscose Rayon. Published 2013 and updated 2015. [Online Image] Available from <https://www.barnhardtcotton.net/blog/know-fibers-cotton-vs-viscose-rayon/>, [Accessed 25/11/17]

Figure 2- BROWN AND WILLIAMS (2013) Environmental LLC. Made-by, Environmental benchmark for fibers. [Online Image] Available from <http://www.made-by.org/consultancy/tools/environmental/> [Accessed 15/11/17]

Figure 3- POSITIVE OUTLOOK (2017) Positive Outlook. [Online Image] Available from <https://www.positiveoutlookclothing.com/#hpabout> [Accessed 15/11/17]

Figure 4- BAM Bamboo Clothing (2017) Established 2005, David Gordon. [Online Image] Available from <https://bambooclothing.co.uk/about/> [Accessed 02/12/17]

Figure 5- BAM Bamboo Clothing (2017) Established 2005, David Gordon. [Online Image] Available from <https://bambooclothing.co.uk/about/> [Accessed 02/12/17]