Sustainable Fashion Accessories for Urban Cyclists

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CHIC·LISTA
Sustainable Fashion Accessories for Urban Cyclists

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Special thanks to
My family for their support in each project of my life
Italy for the hospitality, teachings and experiences during these years
MiGò for his patience, unconditional love and continuous support
SUSTAINABLE FASHION ACCESSORIES FOR URBAN CYCLISTS

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Fashion plays an important role in environmental consciousness. Materials, processes, technologies, everything has to be in line with sustainability.

The development of new technologies has been allowing to increase the possibilities in producing sustainable fabrics with low and zero impact processes. This project intends to analyse the actual and future situation of the sustainable fashion and the consciousness of the consumers.

Christopher Raeburn, Britanic designer, reknown as pioneer of the sustainable fashion design, has his own design guidelines the concept of “Re-Made”. The official site of the “London Fashion Week 2015” referred to his work as: “distinctive in waesthetic, meticulos detail, considered functionality and sustainable intelligence”. These characteristics are part of his new collection “AW15 RAFT/IMMERSE” through which he has presented a capsule collection of outwear and bags made from material recovered from original liferafts. This is the first example given in this area from others that will be found in the sustainability chapter.

On this way, a premise has been built around sustainability and the disciplines that are focusing on it. Fashion plays an important role and it is relevant to clarify that it is not only a matter of the final product, but also the raw materials and technologies involved on obtaining. Everything has to be in line with eco-friendly parameters. This is the scope in which CHIC-LISTA is born, a project that mixes urban cycling as a healthy activity with ecology practices through sustainable fashion, which has the aim of reducing the environmental impact of the industry. CHIC-LISTA presents a collection of sustainable fashion accessories for urban cyclists.
This chapter is focused on sustainability matters around design, fashion and accessories, and its aim is to explain some of the guidelines of the planning and production of sustainable products. To achieve this, a deep research has been developed to find the best examples of sustainability in the fashion system as well as identifying eco-friendly processes and materials.

The fashion industry is going through a genuine sustainable process and social transformation. It is a process that is still struggling with the problem of exploitation, from which the system will come through only with the truly concern from the consumers and the business firms.

It is important to define sustainability, in order to enter afterwards in the specifics characteristics of sustainability in the fashion system, and arriving to understand how sustainability can determine the process of product design.

2.1 The concept of sustainability

Sustainability refers to something that “can be maintained for a long period without finishing the resources or causing damage to the environment”. For example, if it is needed to chop some trees to produce paper, you are supposed to plant the same number plus one to maintain the equilibrium of the system. This is a postmodern phenomenon in which more and more questions appear connected to the environment emergency, the wrong use of natural resources, the cost of the energy, the global warming, and the global over-development, the threaten of natural habitats and resources, industrial products toxicity, pollution of the air and water, and poor waste disposal.

Ecology itself does not mean sustainability yet. This is a more complex concept that takes into consideration not only the environment aspects but also the behaviour and the responsible practices regarding the society, factories, commerce, consumption, welfare, quality and lifestyle, in relation with an specific product.

All this aspects establish a system in which each part alone does not mean anything, but when they work together, we can call this action sustainability. This thesis aims to apply the sustainability to all the creative process in design, and that is why we can call Sustainable Fashion to a product or collection which fulfills the features of being sustainable.

2.2 Sustainable Fashion

The fashion industry, when refers to sustainability, means responsibility, not only environmental, but even social, all along the process of creation of a product. This means that a fashion product can be called sustainable only if the whole process, from the design to the end of the supply chain has been developed under the characteristics that being sustainable requires. Again, not only responsible regarding the environment but also social in all the steps of the supply chain.

4 Sostenibilità: Moda.
[Sustainability: Fashion].
Tartaglione C., Gallante F.
Guazzo G. Pag. 9-10
CHAPTER 2

SUSTAINABILITY

To define the characteristics of what sustainability means in the fashion industry this thesis will take as reference the manifest of the “Camera Nazionale della Moda Italiana” which has developed a document called “Manifesto della sostenibilità per la moda italiana”

2.2.1 “Manifesto della Sostenibilità per la Moda Italiana”

Ten big considerations have been taken regarding the topic, explaining one by one the steps to build a sustainable fashion industry. The Manifest explains the responsibility in fashion from the beginning of the value chain, through the product design, to the education of the consumers on how to maintain the product in the right way while promoting sustainability concern of the company.

The sustainability in the fashion industry can be defined together with responsibility applied to four areas of responsibility; project, environment, social and business.

Project responsibility: A product or collection, from the idea moment, has to be designed taking the manifest’s consideration which establishes for example that products have to accomplish good quality standards in order to make them last long. From the beginning there has to be an awareness of a sustainable value chain in which the design has a lot to be with it. The product could even have a second use while maintaining the style, innovation, function and performance.

Environmental responsibility: these point refers to the project in terms of raw materials, production process, working method, finishing of the product, distribution, marketing. It is suggested to reduce the wastes and refuses through all the value chain, as well as choosing controlled sourcing materials, having low impact to the environment. To respect the animals welfare, avoiding species in danger of extinction is as important as using, if possible, recycled, regenerated or reused materials, as well as using most of all, materials elaborated with natural products; avoiding use of dangerous chemicals.

Social responsibility: actions concerning all the people who take part with a specific product; workers, suppliers, distributors, consumers, all the stakeholders. In this way, the good practices of social responsibilities demand that human rights are respected and well treated along the value chain, recognising the “contribution of every one to the value of the product”. It has to be also with the process, in order to minimize or erase the use of dangerous chemicals for the workers, who have to be maintained under strict standards of timetable, salary and security.

Business responsibility: this last group of responsibilities refer to the actions and decisions that every company has to manage so that sustainability evolves as a whole system in the company. The company is the main responsible of assuring that in the whole value chain actions are taken in benefit of the sustainability of each process. It’s worth to give an example of this like the development of post sale services which allow to make the life of the products longer. The management system should be based on the process “Plan, Do, Check, Act” which allows to have a constant control not only of the processes but also the decisions that are made referring sustainability. Moreover, the company has to be an important participant of the local development and contribute not only with research and innovation, but also with the professional education which will lead to a stronger link with the society.

Having explained all the aspects of responsibility concerning the sustainability in the fashion system, is now the time to specify the scope of this project. Everything will be taken into account but the development will be focused on the design and production of the collection, leaving the business aspects for a further study. From now on, the focus will be put on the first three points of the manifest: Design, Materials and Production.

2.2.1.1 Product Design

According to the manifest, is important to provide some basic consideration. First of all create a long life product that will reduce bad impact on environment. Both on the initials outlines of design and at the end of the value chain. That is why some concrete actions useful for the project of CHIC-LISTA comes to life.

This actions allows the structuration of a “Design Methodology”, as well as considerate some important sustainability certifications in the phase of raw material and processes selection. All this in order to bearing in mind sustainability in the whole design process, and understand how present actions are consciously evolve into the future.

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7 PDCA or Deming cycle/ Shewhart cycle: Management method used in business for the control and continuous improvement of processes and products.

Long lasting, high quality products

Philipppe Starck
“Intelligent Cashmire” line

For people who appreciate the duration and elegance of garment and products. A collection in Cashmire for Ballantyne (Knitwear factory). Clothes with multiple functions, ergonomics, useful for the demands of the modern life. Starck says that “the reason of being of this collection is having always the adequate product in the exact moment and states that is the antithesis of fashion as “system of consume and excess without future” .

Adriana Santacruz has been highlighted for the production of handmade clothes made with native techniques from the south-east region of Colombia. The raw material is sustainably extracted and offers job opportunities for many artisans families through a business that recovers the ancestral knowledge and improves the life quality of the native communities in Colombia.

Attention to environmental and social quality

Adriana Santacruz
Pre-columbian indigenous Loom
The designer Yeohelee Teng has chosen the principle of the economy in design, creating collections without waste, giving de possibility to reuse every part of the material through the elaboration of modular, functional and versatile clothes. They are made of triangular, square, rectangular and a combination of all this geometric forms. This shows an innovative way of taking the best advantage of the product as well as giving a new aspect to the clothes.

“As always the REMADE category encapsulates the collection concept. An original life raft has been re-appropriated to create a stand out limited edition collection of bright and graphic outerwear and accessories.”

Recycled, regenerated or reinterpreted materials. Reuse of products or parts of them after their lifecycle has been ended.

Christopher Raeburn
AW 15 RAFT / IMMERSE collection
Minimal packaging waste

Sustainable packaging is one of the most important points in a sustainable value chain; Stella McCartney is a great example of this because “is a recognized sustainable pioneer among the luxury brands having designed several eco-collections shipped out in biodegradable corn packaging and packaging made of 100% cotton.”

2.2.1.2 Raw materials selection

From the product design, specifications have been defined from which the research of materials and suppliers will begin. The traditional process starts with the identification of potential suppliers, then entering to a supplier selection process, asking for a sample and building a prototype to evaluate it.

When working in a sustainable atmosphere, the potential suppliers are reduced to those who have already worked on their production processes to make them eco-friendly, this is determined by sustainability certifications and labels. Based on this, the materials and suppliers identification will begin from sustainability certified companies and materials.

2.2.1.2.1 Sustainability Certifications and Labels

There has been a significant increase over the past few years in the use of eco-labels, i.e. environmental labels attached to a variety of products to attract the attention of consumers about the environmentally positive features of the products.

Generally these labels are voluntary and mostly used for the promotion of the products on the basis of their environmentally friendly characteristics.

Any product which is made, used or disposed of in a way, that significantly reduces the harm it would have otherwise caused to the environment, can be termed as eco-friendly product. Thus, it involves complete life cycle assessment of the product right from its raw material extraction stage, manufacture, use and to the final disposal with regard to its impact on environment.

Certifications analyse not linear (from cradle to grave) but circular life cycle of products. This concept is called from “cradle to cradle” and it involves the design of supply chains that take into account upstream the reintegration of materials in future production cycles.

Certifications related to production and materials will be analysed for the scope of this Project. Some of them are specific for the fashion industry while others concern to a wider range of products. The objective of analysing and giving some examples is to gain knowledge about the international and European certifications which control the sustainability standards.

EU Eco-Label

The EU Eco-label is one of the labels managed by the European Commission into the environmental area. This label is a Voluntary labelling type that certifies that a product or service is of good environmental quality and guaranteed technical work.

Ecolabel is given to products that throughout its life cycle, from raw material extraction to end of life, generates less environmental impacts on air, water, soil and human health.

Specific products and services have their own assessment criteria. There is an important legislative body that has been created to back up the EU eco-label. Since 1992 this body periodically review it to keep the text up to date and ensure that lessons learned in the implementation of eco-label schemes are incorporated.

Products include Cleaning products, Textile products and footwear, Paints and varnishes, Electronic Equipment, Floor coverings, Furniture, Gardening, Household Appliances, Lubricants, Mattresses, Copying and graphic paper, Tissue papers and others.
Cradle to Cradle Certification

The Cradle to Cradle Certified™ Product Standard helps designers and manufacturers to have a continual improvement process. This process takes account of five quality categories: Material Health, knowing of chemical ingredients of every material in a product, and its effects on human health and the environment, Material Reutilization, designing products which materials can safely return to nature or industry, Renewable energy and carbon management, reaching manufacturing phases powered by 100% renewable electricity and zero carbon emissions, Water stewardship, managing water as a precious resource and important resource for human life, Social fairness, operating throughout the product chain that honor all people and natural system. A product, in each category, receives an achievement level, it can be “Basic, Bronze, Silver, Gold, or Platinum.”

Textile products which have this certification come from many application and type of fiber, like wool, cashmere, cellulose, cotton, and synthetic fibers like polyester and PET obtained from recycled bottles, polyamides and polyurethane.

An example of Cradle to Cradle Silver Certified is Climatex® Dualcycle, is a product based on a fabric technology patented by Dualcycle™ that combine natural and synthetic fibers in layers, allowing later to separate all fibers into the original form to be easily separated and completely recycled.

“Climatex Dualcycle is a durable fabric that combines three fiber types: Cradura™ (recyclable amide fiber), new wool, and Lenzing® FR (FR=flame resistant).”

12 Official Website The Cradle to Cradle Certified™ http://www.c2ccertified.org/get-certified/product-certification

Image 1 - Image 3
Climatex® Dualcycle fabric
**OEKO-TEX® Standard 100**

This is a voluntary testing and certification system, which is uniform worldwide, for the objective assessment of potential harmful substances in textile products at all stages of production through out the textile value chain. All textile products including raw materials, yarns, textile fabrics, finished textile products can be certified.

At the begining of 1990s were diffuse some negative headlines like “Poison in textiles” that wildly branded all chemicals used in textile manufacturing as negative and dangerous to health. In this context was introduced the OEKO-TEX® Standard 100.

“The currently demand in modern textile products cannot be realised without the use of specific chemical substances, however. Modern colours, easy care properties, long useful life and many other functional properties of textiles are required today and can be indispensable for certain applications (e.g. for workwear).

Before introduction of the OEKO-TEX® Standard 100 there was neither a reliable product label for the assessment of the human ecological quality of textiles for consumers nor a uniform safety standard for manufacturers in the textile and clothing industry allowing practical assessment of potential harmful substances in textile products.

The Austrian Textile Research Institute (ÖTI) and the German Hohenstein Research Institute have therefore jointly developed the OEKO-TEX® Standard 100 on the basis of their existing test standards.”

Products with Oeko-Tex® certification are allocated to one of the four product classes based on the intended use of the textile. The more closely a product comes into contact with the skin (and the more sensitive the human skin), the more stringent the human ecological criteria which apply for laboratory testing. Products for babies and toddlers are therefore subject to the most stringent human ecological requirements.

An important example of certified OEKO-TEX® Standard 100 materials is a covering material manufactured and marketed by Alcantara SpA, and an artificial leather fabric called Obika Leather+.

**Alcantara**

It is an innovative material from patented technology Alcantara®, it has special aesthetic, technical and sensory proprieties achieved thanks to a still secret formula. Is composed of about 68% polyester and 32% polyurethane.14

Thanks to its versatility it combines functionality emotions and beauty, allowing to be used in diverse fields, from fashion and accessories, interior design and home decoration, to automotive, yachting, aviation even art.

Diverse textures can be obtained from several processes: woving, pleating, laser perforating and engraving, electrowelding, embroidery, resin printing, embossing and printing, pleating, printing, perforating, thermo welding, needling, cnc perforating and laminating.

This material is an example of respect to ethics and the environment. Has been certified since 2009 as “100% Carbon Neutral, having defined, reduced and offset all the CO2 emissions derived from its activity.”

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14 Official Website Oeko-tex


Image 4: Alcantara Texture
Resin Printed Process

Image 5: Swarovsky Slake Bracelet. Alcantara partnership

Image 6: YKK zipper
Alcantara partnership

Obika Leather+

It is an artificial leather fabric, strength and durable, with a surface resistant to fluids and a structure that make it looks really similar to the genuine leather, perfectly imitating its look, soft feel, and texture. Its properties allow drying spots with a damp cloth.

Can be found in more than 20 colours and is mostly used into sports context and hard traffic divans.

The Obika Leather+ fabricant is Gabriel, Danish Company that ensures that sustainability, consumer safety, and eco-friendly manufacturing processes are its priority. More than 90% of their fabrics has been tested and certified with the Oeko-Tex standard.

Obika Leather+ is one of their materials approved in accordance with that certification, ensuring that it does not contain harmful substances. “Obika Leather+ is free of PVCs, heavy metals and phthalates.”

USDA Certified Biobased Product¹⁹

Is a Voluntary Labeling. This certification has a tree-party method for testing and verifying that a product has a biobased content.

The purpose of this label is to make it easy for consumers to locate and compare biobased products for purchase. By choosing a biobased product labeled, USDA Certified Biobased Product, the consumer can be assured that the USDA and the federal government stand behind the accuracy of the percent of biobased ingredients as stated on the label.

For this label, it has been established a minimum biobased content into a standard way for many product categories. For product been certified with this label, it have to meet or exceed the minimum biobased percentage in its content.

To each product category has been determinated a percentage, however there are products which minimum biobased content have not yet been established, that is why those products must have at least 25% biobased content.

Biobased products are derived from plants and other renewable materials. These products provide an alternative to conventional petroleum derived products and include lubricants, detergents, inks, fertilizers, and bioplastics.

BioPreferred® is the program which goal is to increase purchase and use of biobased products, for its purposes are not include food, animal feed or biofuels.

Eastman Estron™ acetate yarn and Airmem™ are some of the USDA certified Biobased Product.

Eastman Estron™ Acetate Yarn

Is a yarn for textile applications consisting of pure cellulose acetate, a renewable resource derived from wood pulp. This composing gives whiteness to the product. Fabrics woven or knitted with this yarn, have reached the standards of high fashion because of its brightness, drape, hand and comfort. It offers a wide possibilities of colour and textures, and can simulate the look and feel of silk.

This yarn can be paired with others like nylon or spandex to have stretch and recovery properties. Also can be treated to have surface patterns thanks to its thermoplastic qualities. Is available in high and dull lusters, and can be dyed to have bright and true color thanks to the inherent whiteness of acetate.

Estron has been certified by the USDA Biobased Product with “Product 59%” level. Giving in this way possibilities to create apparel with sustainable, environmentally friendly materials.

Airmem™

This is a biobased coffee membrane. The S.Café® is an innovation that has allowed to reach better levels in the textile material. The membrane contains 25% of coffee oil that has been extracted from spent coffee grounds. This allows to replace petroleum-based materials in order to be more sustainable.

Drink it, Wear it.™ Transforming morning coffee into the fabric that enhances sport performance, comfort and daily life is the purpose of AIRMEM™.
2.2.1.3 Transformation and production

Also in the transformation processes of raw materials, sustainability is being taken as a serious matter and new ways are being proposed to improve industries in a sustainable way. In the fashion industry, technologies continue to develop and evolve, achieving improvements not only in quality terms but also in promoting the sustainability consciousness through the relation business-consumer.

2.2.1.3.1 Technologies

Nowadays, sustainability has evolved beyond the ecological parameters in terms of balance and respect for the environment; it has summed up attention to the social responsibility and is evolving everyday thanks to new technologies. Along the years, the sustainability concept has managed to evolve through the process of production which has allowed to improve the efficiency of resources not only reducing the wastes but also creating more consciousness about the people which take part of the value chain of the product.

For example, the fashion industry uses quite much the leather as raw material, and there have been big changes in the transformation process of it to get a more “Clean production”\(^18\). This changes have been possible thanks to the progress regarding sustainability and technology, which have allowed the reduction of Chrome (with which the leather turns softer, more flexible and with a wider variety of colours) in a 90%\(^19\) and the reduction in more than 60% of the water consumption thanks to advanced technologies in the cleaning and use of discontinuous processes which avoid the necessity of cleaning the skins more than once.

On the same way, in the last decades, new technologies have allowed to develop innovative materials with particular characteristics such as water repellence, fire resistance, release of fragrances or drugs, thermal properties, breathable, shape memory, photochronic, thermochronic, anti-bacteria, self-cleaning, among others.

Nano scale material treatments are now possible through processes such as micro encapsulation and plasma, developing new materials and expanding the fields of research in the fashion industry, as well as find new sustainable solutions for life like the case of clothing “herself”\(^16\) (image 13, 14 and 16) designed by Helen Storey who affirms that “Herself tours the world raising the profile of the Catalytic Clothing project and city dwellers worldwide to introducing the notion that clothing and textiles can play a vital role in Improving the urban environment and the health of Those Who live in it.”\(^20\)

Also the laser technology has played an important role in the issue of sustainability, due to the achievements in reducing waste and better use of the material as well as an improvement in production processes in the fashion industry thanks to the efficiency and quality obtained with it.

At first the laser technology was fashionable stuff especially in laser cutting processes, embossed and micro punctured (Image 15) products such as footwear and leather goods. Now, with the development of new technologies, laser has been exploited and applied in the field of technology shaped design “3D printing”\(^21\).

Thus, 3D printing processes especially SLS\(^21\) type, have been incorporated into fashion with wide...
acceptance because of the variety of opportunities that through them can be obtained. From complex volumetric structures applied to accessories like Nike 3D printing sports bag (image 17 and 18) where one can see the new aesthetics possible thanks to the 3D printing, as well as in the potential to creation of a whole garment, like the dress created by the designer Francis Bitonti at a workshop with students to design and 3D-print, creating a delicate dress using clear and flexible PLA filaments. (Image 19)

This technology is not fully developed and is evolving every day and finding better solutions not only in terms of materials and aesthetics, but also as promising a future of more sustainable fashion process.

This is precisely what matters to elaborate this thesis, technological development and research in processes and materials that increase the sustainable value of the fashion products. For example, at CES 2015 (Consumer Electronics Show) was presented the second prototype of Nervous System's Kinematics, a brand that is developing accessories obtained with 3D technology, and in this case presents its second dress, which, like the first, is easier to be produced due to the fact that it manages to compress the volume of 85%, reducing the processing time of 3D printing, using less energy and thus obtaining a more efficient and sustainable product.

Thus, technologies in fashion are constantly growing and seeking improvements towards a sustainable fashion that is in line with the RRRR22 and even beyond it, because researchers are now finding ways to get not only eco-friendly materials but also turn them into part of the decontamination process, as discussed above with the dress "herself".

22 RRRR: Recycling, Reusing, Reducing, Recovering.
2.2.2 Vision about the future

All what has been stated up to now, allows to make way for the vision of the future and understand how today decisions affect the development of this industry of the future of sustainable fashion.

Research to develop new processes and materials is constantly being developed and updated, and displayed as promising sustainability to future generations.

For this reason it is important to know some processes and materials that are currently being developed taking into account sustainable parameters and characteristics. This in order to know and identify some opportunities and new researches that could be the basis of future materials and production processes in the fashion industry.

While these processes and materials are nowadays in research processes, development and innovation, it is important to know them to study new ways for sustainable solutions and innovation for the fashion industry.

Thus, is presented below new clothes creation processes and dyed with microalgae and bacteria base pigments, as well as textiles and materials obtained from cellulose or use of discard material from other processes such as pineapple cultivation.

2.2.2.1 Electroloom

For several years, technicians have been working on a new technology which allows to create seamless garment through a process that could be identified as 3D printing. In late 2013 the first results on generating a small sample of nonwoven fabric (Image 21) was obtained through this process nowadays known as electroloom.

Electroloom was born by a team of biomedical/mechanical and computer engineers: Aaron Rowley, Joseph White and Marcus Foley. They presented their solid project in May 2015 on kickstarter.com rapidly obtaining the resources needed for further research. “Inspired by 3D printers, the maker movement, and accessible design, we set out to build a Technology that Enables people to design and manufacture clothes from scratch.”

The team is currently improving the process, and although initially conceived as a kind of 3D printing because it works as an additive manufacturing, the truth is that the process resembles more to electrospinning (Image 22). Unlike the latter, it does not form a continuous fiber, but uses a solution in a liquid state which passes through an electric field called Field Guided Fabrication (Image 23). Then, fibers of different dimensions, including Nano scale, are formed and attracted by the metallic mold (image 24) in which they are merged together, forming a nonwoven fabric and thereby obtaining seamless garment (Image 25).

While the fabrics made with 3D printing, electroloom uses not only polymers as a solution but has also managed to obtain prototype garments from a blend of cotton and polyester. In addition, traditional 3D printed garments are typically constructed of intricate connections, like joints, that allow the material to bend and move, effectively creating chain-mail that mimics how fabrics actually move.


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“Our material, however, is flexible and light by nature. It’s composed of countless tiny fibers (on the micro and even Nano-meter scale), meaning [...] guarantee to flex, drape, and fold just like you would expect fabrics to do!”

This provides the future of fashion with a more sustainable option in the production of clothing, because not only reduces process time thanks to seamless system technology but also "Instead of sending raw material through factories where it undergoes numerous processing steps to create a traditional textile, Electroloom can directly convert raw material to finished good". This means synergy with raw materials obtained from the approach of BioCouture and others like cellulose extracted from fruit and vegetables. In the future, the materials obtained by bioCouture will be possibly be worked with electroloom process.

So, it can be said that Electroloom is a technology that opens up new fields of research in the fashion industry, and will evolve together with other disciplines, continually improving the properties and characteristics of new materials. "Because Electroloom is fundamentally reimagining how textiles can be created, there is a lot of chemistry that has to be perfected in order for these new fabrics to be developed, which is why we get so excited when we see progress, like increased elasticity." 26

Something yet to be developed is a way to provide color to their clothes in a sustainable way. To tackle with this, two good alternatives would be the following processes which use natural compounds for colouring fabrics.

2.2.2.1.2 Algaemy

"Is a design-laboratory investigating the potential of microalgae as in textile pigment printing." 27 This project turns a product considered as waste in Europe, into a self-grown material, creating a "living color palette" for textile printing.

In 2014, the designers Johanna Glomb Essi (Textile Design) and Rasa Weber (Product Design) revealed the aesthetic potential of microalgae and since then, amazing effects on the pattern color have been achieved, because instead of remaining stable, "the biodynamic color palette of Algaemy textiles changes over time when exposed to sunlight[...] from Green to an intensive blue, from a pale pink to a bright red and orange" 27; each stamped piece tells a story as time passes, say the designers.

The project uses a printing machine called by its creators "an analog printer: an all-in-one microalgae farm, laboratory, and cylinder roller for wheeling across—and adorning—swathes of fabric" 28 (image 26).

Through this system, algaemy proposes a sustainable process as uses the potential of the microalgae in terms of filtering qualities and CO2 absorption, "to create an autarchic circle of production, which does not require additional energy or material apart from man power and the microalgae itself" 29. On this way it becomes an ecofriendly solution for clothing coloration.

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25 http://www.domuseweb.it/en/news/2015/05/22/the_electroloom.html
26 https://medium.com/electroloom-blog/around-the-world-219704ba290f1819
27 http://www.blondandbieber.com/algaemy
28 IDEM
30 http://www.blondandbieber.com/algaemy
32 Microalgae: Scotiellopsis, rhaphoneis, anabaena, nannochloropsis limnetica, haematococcus pluvialis, monodus, nannochloropsis oculata.
2.2.2.1.3 Faber Futures

Faber Futures appears in 2013 as a sustainable process for coloring fabrics based on a research which combined scientific disciplines and the environment to create an ecological material. Everything began in a microbiology laboratory where color living bacterial arises where used in a process to give color to a silk sample.

From this research, led by designer Audrey Natsai Chieza (UK), was obtained a “collection of textiles produced by traditional screen printing but using dyes produced by bacteria” (see images faber futures). This collection continued to develop and evolve, and currently is shown in workshops like the one made in October 2015 “FABER FUTURES Biofabricating Colour for Future Shibori” in Brooklyn NY.

“Living technology could provide the basis for a viable ecological paradigm shift as we endeavour to establish a post-petrochemical global environment.” This Faber Futures color workshop is an introduction to an emerging craft practice of biofabricating textiles.

Faber futures uses Streptomyces bacteria found in soil and decaying vegetation. These bacteria are controlled through the manipulation of nutrient media and growing conditions to obtain a variety of color and pigment production for use in textiles. The meeting between science, biology, technology and creative arts is building the sustainable future of fashion.

So the vision for the future of sustainability in fashion is concluded, understanding that what is currently being developed in the future will turn into sustainable manufacturing processes and materials for textile coloring fashion apparel and accessories.

These examples have demonstrated the potential of new technologies to create garments with particular characteristics like seamless fabric.

Regarding the participation of biotechnology in the fashion industry, it would not be unreasonable to think that the products obtained through processes as electroloom could also be colored with living materials like those used by algaemy and futures faber, generating a set of sustainable processes reducing the use of chemical materials.

Using resources and features that come directly from nature, like the colors and textures of the individual self-growing materials, will reduce the energy consumption of production processes and the pollution levels. Multidisciplinary research has had amazing results in innovation and sustainability, the arts and science join to create “bio-innovation” in creative areas.

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31 http://thisisalive.com/faber-futures/
32 https://www.eventbrite.com/e/genspace-biofabricate-workshop-faber-futures-tickets-190298809167aff=ebrowse
33 IDEM
2.2.2.2 Biomaterial Innovation

In constant research on technologies, materials and new ways to create products, it has been possible to go beyond obtaining materials with traditional raw materials such as cotton or wool, to reach the manufacture of materials from recovery discard product as the case of Orange Fiber proposes “reuse than 700,000 tons of sub product Italian citrus industry annually produces”[34], or also the manufacture of materials based on new raw materials as seen with Piñatex, a material that is still under investigation, which is obtained through the extraction of fibers from the leaves of pineapple.

Another interesting new material case has to do with biotechnology for textiles; BioCouture - grown materials. About it, in early 2014, said BBC News “living materials grown from bacteria could be used to manufacture future products [...] where complex and interactive structures could be grown using cells programmed to assemble into intricate patterns”[35], so commenting on research published that same year in April, about Natural Materials[36].

However, already in 2011, the Fashion Designer Suzanne Lee was active in the field of materials research for the future, where great emphasis on rethinking future materials. “As pressure on natural resources intensifies, research is re-examining the use of microorganisms to produce fibres. Previously unable to compete with cheap oil-derived synthetics, cotton or even leather, bacterially produced cellulose has the potential to step up as a sustainable environmentally friendly alternative”.[37]

Given this premise, Suzanne Lee creates BioCouture, the first biocreative design consultancy in the world, a project led by Lee and a group of scientists who work in research for the use of cellulose obtained from bacteria and microbes to build the biomaterial textiles, and as a result it has been created garments made from the use of green tea, sugar and microorganisms. (See Process of obtaining cellulose)

Thanks to these initiatives, it is currently growing and evolving theme of biomaterials and biotechnology, projecting not too distant future, as a major area where biological processes would be used for the creation of sustainable materials for different uses, as demonstrated with other whose applications research about the areas of product, architecture, furniture, accessories expand.38

Orange fibers and Piñatex are sustainable materials obtained from vegetable fibers and elaborated in a way that allow to obtain nonwoven fabrics with certain characteristics. Orange fiber expels the benefits of C vitamin present in this citric fruit. In piñatex case, appearance is similar to leather.

Orange Fiber

This project have created sustainable and vitaminic fabrics from citrus waste. Thanks to this intend to transform citrus waste – currently valuing 700,000 tons just in Italy – in a sustainable, biodegradable and vitamin enriched textile.

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To create this orange fabric, it is used cellulose extracted from discarded material from oranges and is spun to form the fiber. From pressing and processing oranges and thanks to nanotechnology, citrus fruit essential oil is encapsulated and fixed to the fabric: “the material obtained is, therefore, also able to leave the skin soft, not greasy, just as if a body lotion has been used.”

As it is possible to see, cellulose is a major element useful to begin production of a biomaterial, which could be seen as key to the future development of many biomaterials from various fruits that can be found particularly in areas where the variety of tropical fruits and vegetables is quite extensive. Countries like Colombia, Brazil, Australia, South Africa, Philippines and others are important cores of natural resources and potential territories to supply raw materials to create biomaterials.

Just this last country it is example of another research project resulting in the development of a natural, innovative and sustainable material with similar characteristics of leather; this project is called Piñatex.

**Piñatex**

It is an non-woven textile developed by Ananas Anam. After seven years of research and development, has been created a natural textile from waste of plant fibres. Piñatex uses advanced technologies to create a sustainable and high performance natural textile.

“While the initial development work leading to Piñatex originated in the Philippines, significant research & development is now being undertaken between the UK and Spain.”

Piñatex is inspired by the Cradle-to-Cradle® approach, and take advantage of agricultural waste. Its fibers are the by-products of the pineapple harvest which allows have the main material of piñatex without extra land, water, fertilizers or pesticides than the used in the harvest.

All these features make Piñatex a sustainable material not only for being eco-friendly but for makes inclusion of the people who grow pineapples in the Philippines also creating jobs and social progress and providing additional income for farmers while creating a potential new industry for pineapple growing countries.

For processing the raw material is used Piñatex Intended Life Cycle (See image Piñatex process), a cyclic process that includes pineapple crops, then a gathering to pineapple leaves decorticating process, from which results fibers and biomes. The biomes goes to other possible use like biogas or soil nutrients, while the fibers continues in the process entering in a degumming step (Water reining to Eliminate unnecessary oils from the plant), Then, the fibers pass across to a non woven mesh to create the material arriving at the end going across the finishing process.

The cycle allows final products available to the life cycle into two types, one Technical Cycle, allowing reinterpret the material to create new products, or Biological Cycle ending becoming biomass useful for nutrients that will serve to nourish pineapple crops and thus restarting the cycle.
So this research, along with Orange Fiber and BioCouture form an exemplary set of sustainable innovation applied to the fashion industry, and can be taken as basis points to continue forward with the creation of biomaterials. As time progresses, likewise grow innovation in technological terms, enabling future imagine that the creation of biomaterials will be easier and will have further developments as to obtain characteristics that some of Suzanne Lee products do not have such as impermeability.

For this reason, this field of research opens more possibilities every day and as it have said before, will probably get biomaterials from cellulose obtained of diverse fruits presents in the planet, especially in the tropics.

2.2.3 Ecofriendly Accessories

This part present some specific ecofriendly accessories obtained with sustainable materials. The first example is the collection of piñatex material, some accessories created by different recognized product brands as Camper, Puma, Ally Capellino and others. The second one is a product obtained from market fruits waste, a bag that have behind a sustainable thinking and intends to reduce the waste of high quantity of fruits discarded in the supermarkets in Rotterdam. The last one example is an important fashion brand recognized as one of the most important and influential in terms of sustainable fashion, this is Stella McCartney with the bag for camera Canon EOS 100D produced in Eco Alter Nappa, a vegetarian leather created and used by the brand from 2013.

2.2.3.1 Piñatex Collection

The applications of the Piñatex process, already described, are presented, showing the first accessories obtained from the use of cellulose pineapple leaves as raw material and highlighting aspects of interest concerning in the elaboration of a sustainable product.

Piñatex is a material that looks like leather but comes from leaves, providing farmers with a new additional income while creating a vibrant new industry for pineapple growing country clubs. It also creates jobs in the phase of gathering and cultivation of raw materials, so this brand is recognized in consolidated ethics will of sustainability.

No extra land, water, fertilizers or pesticides are required, because this is the same process of pineapple cultivation, which turns the agriculture into a more profitable activity while generating less waste. The potential of Piñatex is demonstrated on the interest that important brands have put on designing accessories using Piñatex.

"Piñatex is produced on 218cm or 150cm width textile rolls at a competitive price. Piñatex is tested according to ISO international standards for: seam rupture, tear resistance, tensile strength, light & colour fastness and abrasion resistance."42

Piñatex Intended Life Cycle

*Manufacturing process. Diagram of piñatex intended life cycle. Taken from: www.ananas-anam.com

*Image 37

*Worker from philippines community and pineapple leaves. Taken from www.ananas-anam.com

*Image 38

Piñatex Collection

2.2.3.2 Fruitleather Rotterdam

This project is another important case of sustainable material because it is a product of the recovery and use of waste produced by fruit markets in Rotterdam, The Netherlands. Around 3500 kilo of fruit are discarded like trash per market day (Tuesday and Saturday) in Rotterdam. It is a project that has still a lot to develop, but it must be said that it has a great growth potential. As stated at the end of “Future Vision”, fruits are becoming an attractive point of research thanks to the possibilities that are being opened with the development of biomaterials and new ways of processing.

The creators have called this material “Original Rotterdam Fruitleather”. They were inspired by a technique used in culinary field; the “Chefs use different technics to create wonderful flavour experiences with fruits and vegetables using them to garnish their plates. One of those technics is to mash, cook and then dry fruits to make them into a candy like piece of fruit called Fruitleather.”

They gather food waste from market stands, mash it up, dry it out, boil it to remove any bacteria and prevent rotting, and roll it into a flat leather. A bag created entirely with Fruitleather has been exposed to tests of strength and durability, with positive results and yet with possibilities to improve as it is still under development. (Image 43-47)

2.2.3.3 Linda camera bag - Stella McCartney

Stella McCartney is, without doubt one of the greatest exponents when speaking about sustainable fashion. As a vegetarian company, it works to act responsibly, honestly and modern avoiding all use of polluting, or from animal sources or power supplies. Her stance toward sustainability defends in this way, “I believe in creating pieces that aren’t going to get burnt, that aren’t going to landfills, that aren’t going to damage the environment. For every piece in every collection I am always asking what have we done to make this garment more sustainable and what else can we do. It is a constant effort to improve.”

Responding to these questions is that not only it manages to create sustainable collections, but also “desirable and beautiful luxury”.

Thus, its work in sustainable fashion can be illustrated by “The Linda Bag” a faux leather bag designed exclusively for Canon. It is made with Eco After Nappa, a vegetarian leather which the brand use since 2013 and is made from polyester and polyurethane and has a coating made with over 50% vegetable oil a renewable, natural resource. It comes from non-food sources and allows use less petroleum in products.

While it is one of the alternatives and sustainable solutions of the firm, it is not the only work of this designer. It is really a great example of all sustainable business system, because even in its packaging innovating solutions have been applied looking for sustainability, like biodegradable corn packaging.

This concludes the presentation of eco-friendly accessories as well as the chapter concerning sustainability in the fashion system. Now, not forgetting the generalities of sustainability, a new chapter is opened concerning an urban activity that is identified as a lifestyle towards a sustainable and healthy future. This third step is called: Urban Cycling; zero impact transport.
Frutileather Rotterdam

Image 43 and 46
Frutileather process manufacturing
Taken from: http://noctulachannel.com/cabedal-de-fruta-frutileather-rotterdam/

Image 44
Detail of Frutileather material
Taken from: "Dutch Students Turn Wasted Rotting Fruit into “Fruit Leather” Accessories"
www.odditycentral.com

Linda Camera Bag - Stella McCartney

Image 45 and 47
Frutileather Bag
Taken from: “These leather bags are made using leftover fruit and vegetables”
http://metro.co.uk

Linda Camera Bag
Images taken from: “Stella McCartney limited edition for Canon”
http://www.canon.co.uk/stellamccartney/
The issue of sustainability is actually present in almost all activities developed and decisions taken, whatever the field. Design, architecture, urban planning, among other disciplines, have been involving sustainable features in new projects. Some features like the vertical gardens generate new forms of landscaping (Image 1) and rainwater collecting systems and solar panels create self-sustainable structures, improving health and environmental quality in cities. (Image 2)

In many cities, lot of effort has been given to sustainability features like building an adequate bike infrastructure, including not only cycle paths but also bike parking. This has permitted the growth of urban cycling which is the main issue in this chapter, highlighting not only the benefits to the environment but also the healthiness of cyclists. Thomas Krag, expert in mobility and urban cycling, says that contrary to what is thought, cyclists are not exposed to more pollution than drivers, since the concentration of smog is greater inside the cars than in the air you breath when commuting by bicycle. (Image 3)

To understand urban cycling it is necessary to know its historical evolution and the needs involved when traveling by bike. The growth of this activity and the trends on the styles of bicycles will subsequently lead to the identification of an opportunity in an emerging market.

3.1 Birth and evolution of urban cycling

This part of the third chapter intends to explain the birth of cycling as mean of transport in cities, and to show the evolution of the bicycles in the line that brings to the actual and most common urban bicycles; classic and folding bike.

It is useful to explain first, what the term “urban cycling” means, in order to understand the characteristics of this activity, its context and typical users.

Starting with concept of urban cycling, then entering in the origin and evolution, to start perceiving the activity as a growing phenomenon in emerging cities, involving promoting events and institutions. This chapter will also include the study of urban cycling as a way of sustainability and healthiness.

Finally, an specific market has been identified in one of the most important cities in South America, explaining its conditions, needs, potential customers, and possible competitors, to identify opportunities with the aim of introducing a new product to satisfy the needs and desires of the urban cyclists.

3.1.1 Definition of Urban Cycling

The term cycling is often associated with a sport in which a bicycle is used to race in various scenarios such as route, circuits, mountain or other. However, it also refers to the recreational or functional activity of cycling through cities.

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Thomas Krag. Founder of Thomas Krag Mobility Advice
www.thomaskrag.com
Urban Cycling consists on using a bike for daily or frequent travel within and around cities. While it does not require as much effort as in sports cycling, it still favors the health of the user and is performed primarily as an utilitarian mean; to go to college, work, shopping, errands, sightseeing or just leisure.

Travel times in urban cycling are usually between 15 and 40 min; approximately 2-8 km each way. These values vary according to several aspects, from which the size and topography of each city is one of the most important, but also the existence of urban infrastructure, cycle paths, safety conditions, among others.

The use of bicycles as a mean of daily transport generates great advantages also in economic aspects. According to the “Report Bike Mobility in Bogotá”\(^{48}\), the bicycle as a vehicle represents not only a lower cost compared to a car, but also means less infrastructure maintenance costs. Also, “It is estimated that bicycles save the consumption of 240 million gallons of gasoline per year in the world”\(^{49}\) as well as “saves the emission of 1.5 Kg. of CO2 at day each 5 Km.”\(^{50}\)

3.1.2 Origin and evolution of urban cycling

Talking about the origin of the bicycle, it is difficult not only to determine an exact year of creation but also to associate it to a single person. What is clear is that the first ancestors of modern bicycle started being used around 1800.

This thesis will explore the evolution of the bicycle based on the article “The development of the Bicycle” of American on the Move division of the Smithsonian National Museum of American History\(^{51}\).

The first approach to the bicycle occurred in 1817, when Charles, Baron von Drais, thought about using a front wheel capable of being steered, and joined it with a paddled saddle and an armrest in front of his body. He obtained a united states patent in 1818 and then moved to Paris, where he obtained another patent for his project which acquired the name “veloicpéde”.

Around 1863, in the workshop of Pierre Michaux in paris, pedals were added to the front axle of the velocipede. However it’s not possible to say if it was he or his employee Pierre Lallement who did it. Then, Lallement moved to Connecticut, where in 1866 he was granted a patent for “improvements in velocipedes.”

“Americans began to show an immense enthusiasm for the velocipede, but the craze ended as suddenly as it began”. The reasons for the decline were that riding a velocipede took a great deal of strength and coordination.

The velocipede started to be called bicycle when wire-spoked wheels were implemented around 1870. On this line in 1871 James Starley of Coventry introduced the Ariel which gained popularity and laterpatent for his project which acquired the name “velocipedes.”

“Ordinary, or high-wheel bicycle, was light weight and fast. But it was also hazardous, since the rider’s center of gravity was only slightly behind the large front wheel”. A race to redesign the bicycle began and the “Safety” bicycle appeared. These cycles

[Image 1: Vertical Garden in Herzog & Meuron Caixa]
[Image 2: Garden in the roof Sustainability- Energy Saving Charles David Keeling condominiun Kieran Timberlake Taken from: Official Site “UC San Diego News Center” http://ucsdnews.ucsd.edu/ feature/reaching_for_the_sky

[Image 3: Exposure to pollutants depending on transport mode. Taken from: Cycling, safety and health. Thomas Krag. www.thomaskrag.com


\(^{49}\) IDEM

\(^{50}\) IDEM

\(^{51}\) “The development of the Bicycle, America on the move”
http://amhistory.si.edu/onthemove/themes/story_69_2.html
had two small wheels of equal size, a chain driver, and gears. Soon after this, John Boyd Dunlop patented a pneumatic tire and brakes were also improved in the 1890s.

Between 1900 and 1905, with the introduction of the automobile and other factors, the number of bicycle manufacturers in the United States shrank from 312 to 101. Thereafter, for over half a century, the bicycle was used largely by children.

Recent cycle development has not involved significant changes in construction, but rather a refinement of earlier features. During the late 1960s there began a reawakening of adult interest in cycling as a non-polluting, non-congesting means of transportation and recreation.

The folding bike has its origins in the military use; they started being used by the French army as early as the 1890s. However, it is around 1970 when the popular interest in them began to increase.

With the increasing size of cities and the increasing distances (commuting) to go to work, folding bike becomes a complete solution combined with urban transport. While today trains allow to carry large bikes, it cannot be said the same about subway, tram or bus. The folding bike is also suitable for the limited storage space it occupies.

There are other popular designs for urban cycling for middle and short distances. Of these, the more popular is the classical or Dutch opaafelts and comfort, descendant of the city bicycle.

This graphical summary (Image 4) shows the line of descent of the urban cycling bikes: classic and folding bike. It is based on a infographic of the history of the bicycle made by the “Pop Chart Lab”62.

3.1.3 The bicycle as urban phenomenon

Urban cycling is certainly a growing phenomenon globally. This is confirmed by countless studies about this activity, which show large dissemination of it all around the globe.

According to the Eurobarometer survey, by the European Commission in October 2014, the countries where most people use the bike as a means of transportation on a typical day are The Netherlands (26%), Denmark (23%) and Hungary (22%). In The Netherlands while the country average on the use of bicycle is 26%, big cities score between 35-40%. The type of mean of transport used is strongly connected to the distance that people have to commute to their jobs or schools, taking into consideration that the use bike can be combined with public transport especially when talking about folding bikes.

In Copenhagen for example, from the people who travel to work less than 10 km, 53% uses the bike most of the time, while this number drastically reduces to 6% for distances longer than 10 km. When distances go longer than 15 km less than 1% of the people uses the bike; this is a big issue considering that in Copenhagen 27% of the commutes are longer than 15Km. The short and medium commuting distances represent 62% of the total in Copenhagen.

According to the Cycling Embassy of Denmark “The infrastructure is the basic for developing a

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cycle culture. Most major cities in Denmark do have rather fine facilities for cyclists even though the cycle net still needs to be extended and improved. The major Danish cities do have 300 – 500 kilometres of cycle paths each, and a few missing links holds them from finishing the work.

Today, some cities are just 5 – 10% from completing the overall master plan for cycle infrastructure which normally has been an ongoing job through more than 30 years.53

Around the world there are big cities which have followed the example of countries like Denmark; improving the network of cycle paths, bicycle parking, public bicycle systems, among other stuff. This has allowed a huge increment in the practice of urban cycling in Europe and other non-European countries. In Milan for example, bicycle networks, have been expanding year after year, since 2009 on an average of 18km per year. (Image 5)

In addition to the availability of transport infrastructure, there are other important reasons for using the bicycle as the most often mode of transport. Out of these the highest concerns regard the environment and health in the form of air and noise pollution (22%). But are actually the price (24%), the speed (27%) and the convenience (49%) the main reasons for using the bicycle.

Is when comparing with other mode of transport (Car, Motorbike, Train, Boat, Public Transport and walking) when the environmental issue gets important, as from the other modes of transport, less than 10% uses it because environmental issues.

Being urban cyclist does not mean loving cycling but improving everyday commuting experience. People use the bicycle because of its associated benefits to the environment, but infrastructure is important to allow safe and fast commuting to jobs.

3.1.4 Urban cycling as lifestyle

Urban cycling does not only mean using the bicycle as a mean of transport in the city, but also a lifestyle where transport, fun and communities appear to share common interests.

The urban cyclist becomes a member of a group with similar interests, who share the same activity as a source of health as ecofriendly attitude. It becomes a reason to socialize, to have fun, to contribute in developing a friendlier and more sustainable world. Being exposed to situations of vulnerability when riding a bicycle, cyclist get tolerant and respectful in the relationship with others.

In almost every city where it has been developed plans to encourage the use of bicycles as urban transport, institutions and groups of cyclist have emerged in grade to promoting and increasing the use of bicycles as a mean of urban transport, highlighting its benefits and create links with other cyclists to effort communities and activities. (Image 6 and 7)

Below has explain some functions of the institutions and events around urban cycling, and the attitudes in terms of sustainability and healthiness into the cycling communities.

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3.1.4.1 Encouraging Urban Cycling

In some medium and big cities of the world, most groups of cyclists, have a weekly meeting in which they go for a ride in order to encourage the use of bicycles as alternative transportation in town. Many of the groups are led by volunteers, other receive support from public or private institutions.

One of these groups is “San Francisco Critical Mass”, a massive bicycle ride which takes place on the last Friday of each month. Perhaps it is the oldest of cycling events, it was originated in San Francisco in 1992 and has been replicated in more than 300 cities around the world.

“Celebrating a shared sense of Rediscovering urban spaces, Critical Mass riders cross borders and find common cause to have a good time on foot- powered red wheels. These rides Also uplifting challenge the use of city streets and the domination of cars and oil in our transportation system.”

There are also other groups and organizations around the world, in big and small cities, who meet “in order to generate impact on the society, to foment the bicycle like a daily transport use, raising the awareness of the city mobility, the social and the individual benefits generated by the daily use of the bicycle. At the same time, seeks to reduce the problems of transport like engine contamination, noise, traffic jam, insecurity.”

Another type of event is the Tweed Run is an event of riding with a vintage theme that takes place once a year. Another type of event is the Tweed Run is an event of treatment the bicycle like a daily transport use, raising “in order to generate impact on the society, to focus the municipality authorities and private sponsors.” says the Inter-American Development Bank.

3.1.4.2 Urban Cycling: Sustainability and Healthiness

Gradually, cycling is becoming a catalyst for a broader agenda of urban sustainability and people-centered development. Is one of the most sustainable methods of urban transportation. “With the exception of walking, it requires fewer natural resources and produces less waste than any other mode of transportation.”

When comparing the advantages of various means of transport, cycling is an important alternative which does not generate air pollution nor noise in the environment. To make a serious study based on Life Cycle assessment of different modes of transport, it is necessary to note that “the production of a bicycle alone also entails GHG emissions [and] it is important to quantify its impact and ability to reduce GHG emissions.”

The study estimated CO2 emission values for each phase that involves cycling as a means of transport;

Production and maintenance of bicycles: 5 grams CO2e / km,

Operating: “looking at additional dietary intake of a cyclist compared with a motorised transport user”, combining the data of kilocalories, weight, time, distance, the study estimates that the “fuel” of the cyclist can be: 16 grams CO2e / km.

All in all, “the life cycle inventories of a bicycle reveals that bicycles release about 21 grams of CO2e per passenger kilometre travelled.” Having a CO2 emission value the bicycle is still in a favorable position in terms of sustainability as it represents a much lower level compared to car or bus for which the study estimates 271 grams CO2e per passenger-km and 101 grams CO2e per passenger-km respectively.

Cycling has many positive impacts on health and the environment. These impacts are of different types, affecting one’s physical activity, safety, air quality and noise, and the climate; and occur at different level: individuals as well as local and global populations are positively impacted.

Thus the benefits has been identified in the environment, next some data will be given, that allows to highlight the potential benefits from a physically active lifestyle; and what degree the bicycle could play a role to prevent physical inactivity.

According to a study by “The Danish Ecological Council” urban cycling involves physical activity and has a positive impact on the health of the practitioner, thus reducing risk of getting several deseases related to physical inactivity. Cycling to work has a very significant effect on health.

Even after adjustment for differences in terms of job, smoking, leisure time activities and body mass index people who cycle to work have a 28% lower mortality rate, says Thomas Krag in a Danish study about physical activity and mortality.

“Physical activity – such as cycling- has significant benefits for health. It reduces the risk of cardiovascular disease, diabetes and some cancers, helps control weight, and contributes to mental well-being. Moreover, taking part in physical activity increases opportunities for making friends and feeling part of the community.”

3.2 Being Urban Cyclist – Market Study

These considerations of urban cycling as a key element in sustainability and healthiness, lead to consider important to identify and analyse a market on emerging urban cyclists.

Through market study, it is possible to highlight the existing and future opportunities in urban cycling and put forward some inclusion strategies for CHIC·LISTA products into its target market.

To make it clear, some relevant data about the market conditions like geographic area, industry, needs and opportunities and potential customer, is presented below. Also there have been identified some brands of urban cycling accessories in order to know which products exist and therefore recognize unmet needs and opportunities for CHIC·LISTA.

60 “Bicicladades 2014”: Dynamic Atlas of urban cycling in Latin America and the Caribbean, IDEB Inter-American Development Bank

61 CyCle more often 2 Cool down the planet! Quantifying CO2 savings of cycling. European Cyclist Federation (ECF)

62 CyCle more often 2 Cool down the planet! Quantifying CO2 savings of cycling. European Cyclist Federation (ECF)

63 CyCle more often 2 Cool down the planet! Quantifying CO2 savings of cycling. European Cyclist Federation (ECF)


65 “Bicicladades 2013”: Regional study of use of the bicycle as a mode of transport in Latin America. Study conducted by students of American University School of International Service at the request of the Inter-American Development Bank, emerging and sustainable cities initiative


67 Cycling will improve environ- ment and health. Ege C. Krag T.

68 History of the Tweed Run. www.tweedrun.com

### 3.2.1 Market Conditions

#### Geographic area

To launch CHIC·LISTA, Latin America and Caribbean (LAC) has been identified as the ideal target market, because it represents an area with cities with great growth potential, both of population and economic. Cycling infrastructure and promoting campaigns on sustainable, efficient, accessible and safe mobility have been developed with the support of international organizations like the Inter-American Development Bank (IADB), which mentions “in the cities of Latin America and the Caribbean (LAC), the use of the bicycle as urban transport is growing significantly and is helping to improve mobility, equity, socio-economic opportunities and environmental conditions”. At the present time, 95% of cities have implemented campaigns to promote the use of bicycles, and 85% use policies for promoting it that is working with public bodies.

“IADB supports LAC cities promoting low carbon transport, being presented equal access to socioeconomic opportunities for everyone. Cycling means an important opportunity to improve urban mobility.” Communities and campaigns as Bicicudades work to promote urban cycling and therefore, are permanently updating information on the use of bicycles, helping to improve the life quality in these cities. These organizations work together with international networks such as the Danish cycling embassy, helping to improve the life quality in these cities.

In this context and considering the range of accessories for the urban cyclist in Bogotá, it is often perceived a preponderance of accessories for men or unisex, while the exclusive female market is quite unexplored. This is an historical fact due to the lesser participation of women in the use of bicycles compared to men. However, in recent years it has identified a significant increase in the number of female urban cyclists, it is known that in 7 of the 9 most representative LAC cities, the participation of women is above 20%; Montevideo represents the highest percentage of female gender cyclists with 40%. (Image 10)

Bogota is a city with approximately 8 million inhabitants from which, according to the study cycle inclusion in Latin America and Caribbean, 23% of them are female. It can therefore be said that participation of women as urban cyclist in Bogota is not small and has potential for growth, helped by the fact that it has the largest cycling infrastructure in LAC. That is why it is recognized a key city to start the CHIC·LISTA project.

As well as Bogotá, the city of Rosario in Argentina is also key because it is another big city that with a mobilization of 30% of female cyclists. Also because in Rosario has been obtained the highest percentage of urban transportation by bike, followed by Bogotá. 5.3% and 5% respectively (Image 11). In this way, Rosario is identified as the second main city to continue with CHIC·LISTA project.

#### The Industry

The GDP of Colombia is projected to grow in 2016 at high levels. The National Business Association of Colombia (ANDI) affirms that in 2015, “indicators of the manufacturing sector began to react favorably and ended the year with a positive rate and possibly 2016 will be better.” The current Finance Minister Mauricio Cardenas said that the industry sector is expected to grow the most in 2016. This growth in manufacturing, together with the potential increase in demand on urban cycling products, it can be assumed that this industry sector in Colombia is a favourable context for the CHIC·LISTA project.

There are several sale and manufacturing business of bicycles and accessories in Bogota out of a benchmarking is presented below (Point 3.2.1.1). Even though, accessories for cyclist—not for bicycle—are still just a few. Many of them are promoted as unisex products, but the truth is that the characteristics are more in line with a male gender cyclist, leaving female client outside the exclusivity and limited to the consumption of products on many situations not in line with their style.

Taking into account all of what stated above, the demand in urban cycling context in Bogota is growing while the offer on the female user is limited. Then, Colombia can be a great opportunity to satisfy the needs of the potential female customer.

#### Needs and Opportunities

The growth of urban cycling in LAC and particularly in the case of Bogotá, represents an opportunity to explore the scenario and generate proposals to satisfy specific needs. Principally, CHIC·LISTA seeks to satisfy a female customer in Bogota, because there are less accessories exclusively offered to her. In the current market, the characteristics of the urban cycling accessories are more in line with a male customer. This means a restriction in for the women cyclist who is obliged to the consumption of products that do not represent her personality and style.

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65 Latin America and Caribbean in 2015 had more than 2500km of Bycicle paths. From this, more than 390km are in Bogotá, a big city with more the 6 millions of inhabitants.


67 IDEM

68 “Ciclo inclusion in Latin America and the Caribbean. Guide for promote the use of the bycicle. IDE, Interamerican Development Bank. 2015. (Original Title: Ciclo inclusion en America Latina y el Caribe. Guía para impulsar el uso de la bicicleta.)

69 Colombia can be a great opportunity to satisfy the needs of the potential female customer.
Women cyclists in Bogotá use their bicycle to go to work.

69%

Gender cyclists are between 21 and 32 years old.

75%

Highly important that accessories have resistance environmental factors.

71%

Women cyclists in Bogotá use their bicycle to go to work.

69%

Use bicycle because is environmentally friendly.

16%

16% consider folding bike as the best type to Bogotá city.

Potential female consumer is between 25 and 30 years old.

49%

58%

Bikes mostly used in town

Mountain: 51%

Classic: 33%

Use bicycle as healthiness

54%

Use bicycle as useful in combining cycling with trips on public transport systems.

Currently, the most used bicycle types in town are the classic with 33% and the mountain bike with 51%. The latter turns out to be the most used because it is the most common bicycle in Colombia.

However, these percentages go down to 27% and 45% respectively when asking which is considered the best type of bicycle to use in the city, while the percentage of the folding bike goes up. Even if folding reaches only 16% now, it is viewed as the most practical bike for the future due to the ease with which it can be stored and because it is useful in combining cycling with trips on public transport systems.

When analysing the needs, urban cyclists consider “important” (33%) to accommodate easily accessories on the bike, other 39% consider it “very important”. In terms of the accessories sizes, 59% say it is important to be not larger than a univeristy backpack. Only 9% considered important a place where carry water, and 3% needs where to accommodate the computer. Besides the type accessory, 9% said that its design should help to prevent theft.

Considering the accessories resistance to environmental factors, 71% of users consider this “highly important”, 20% assigned “medium importance”, and just 9% gives “low or zero importance” thereon.

In terms of cycling motivation, environmentally friendly is the second most important reason to use the bike it represents 58%. The first one is the ease of travel (64%) and thirdly by health (54%) followed by administration of the time (45%). Economy is less important (40%) as well as speed (34%) and others such as tourism and freedom get less percentage (17%).
Out of the problems perceived by the cyclists, only a few consider security issues is a reason not to move in the city with bicycle. From 100 women cyclists, 18 said that there is no security in the city and 14 in 100 feel afraid or vulnerable to accidents. According to Andres Felipe Vergara, from Secretary of Mobility of Bogota “Insecurity is more a matter of perception than reality”69, then what is important is working on changing that perception among cyclists.

Programs like “Biculudades” work to increase security through collaboration activities and others that have improved cycling infrastructure and security conditions through surveillance and control.

Back to the survey, several people stated that they prefer to carry on the bag in front because are afraid of theft. When bag is positioned in the front of the bike, some women said that there is a risk of dropping it to one side and causes to lose their balance. Others affirm that they do not have cute accessories and either not suitable for rain. The characteristics of most products on the market have a more masculine language and are not pleased at the chic feminine style.

Another recurring problem is using the bike with heels. While on one hand the women say heels facilitate the stopping time at a traffic light because it gives them more support on the floor, the same cannot be said when pedaling. The foot can slide from pedal, while if the pedal is put between the heel there may be risk of pedal entrapment and the sole there may be risk of pedal entrapment. In addition, the foot can slide while if the pedal is put between the heel.

Potential customer
It has been identified the urban cyclist woman in Bogotá as potential customer for CHIC-LISTA. To understand its characteristics it has been made a study of a sample of 100 female cyclists in the city of Bogotá68. Most female cyclists (75%) are between 21 and 32 years old. The highest percentage of respondents cyclists are 25 years old (in 2015) with 10%, followed by the age of 30 years with 9%. 7% is 28 years old and 29 to 27 years with 6% each. The rest aged between 19 and 60 correspond to less than 5% and from 33 years does not exceed 2%. This allows to say potential female consumer is mostly between 25 and 30 years old.

Mostly female cyclists in bogotá are related with creative areas: 23% is the group of Architecture, Design, Publicity, Music, Art. Then administrative areas, engineering and students (from different areas) with 13% each, then humanities 11%, and health areas represented by 9%. The rest as science, technology and sports, reaching values lower than 5%. In terms of purchasing power, 84% of respondents said to belong to a “middle income range”. 8% low purchasing power and 8% higher.

Therefore, the look of the potential client is not sporty, rather, are women who dress in chic style, and this is no impediment for biking, this is confirmed by 81% who respond that using the bicycle even if wear a more formal attire. In 2007 in Denmark comes a bicycle culture that is now known as Cycle chic; it can be described as “sustainable mobility with style.” Cycle chic is a growing trend in cities that are investing in bicycle infrastructure and facilities that is why the prospect of CHIC-LISTA can be recognized within that culture.

The sample under study confirms that for women cyclist fashion, style and trend are “important” or “very important” 49%. It is indifferent for 33% and only 18% believe it is not important. 39% of the potential customer uses the bike every day, 32% say 3 to 4 days a week and 6% fair days. So over 75% use the bike often. Only 23% use bike on weekends or less than 2 days a week.

The cyclists are examples of culture, tolerance and responsibility. This is confirmed when they say for example: “bystanders are always a danger. So when I do not go cycling and instead of I go like pedestrian I get the care to do not walking into the cycling trail” referring also to be careful and respect the spaces for cyclists and pedestrians.

In conclusion, the potential customer for CHIC-LISTA is woman between 25 and 30 years old, which moves in Bogotá with her bike, mostly to go to work. She prefers to wear a more formal look and this is not an impediment to cycling. Most it unfolds in creative contexts such as architecture, design, art, music etc., and considers the folding bike as one of the best options because of the versatility and ease to combine cycling with Public transport. She could be defined with eco-chic style just because she practices sustainable mobility with style.

3.2.1.1 Benchmarking
In Bogota exists some brands that produce accessories for cyclists, but most of them are limited to sportswear, rainwear and clothing customization. Just few like “Yugo messenger bags” produces accessories like bags but those have a very masculine and street style. So brands like the latter, or “Anfibia”, “Aride”, “Fiera”, “El gran pez” and “Cubrete” do not represent competition for this project because the target they address, is very different from CHIC-LISTA.

Next are shown some examples of the products that offers those brands, in order to know the kind of existing products of urban cycling and recognize that they are not the target in which CHI-LISTA has been positioned.

All these brands are related to urban cycling, intends to satisfy some needs of urban cyclists but are not enough and as seen on their advertising and promotional media, those brands are created just to produce something, but in terms of added value are so basic and have not as much innovation or attractive aesthetics inspirations.

Opposite to the intentions and target of CHIC-LISTA, known those brands is useful to identify weaknesses in the cycling market in Bogotá city and understand the opportunities to entry with new products full of added value and sense of design and functionality.

69 See results of “Bogotá urban cyclist survey, female gender”. 2015
YUGO messenger bags:
- Street style bags
- Aggressive aesthetic
- Colorful
- Male design

Photos taken from: Official facebook profile. This brand do not have official website.

ANFIBIA Rainwear
- Waterproof garment.
- Brand for women and men but have only rainwear.
- It does not design accessories or bags, just garment.

Photos taken from: Official facebook profile. This brand do not have official website.

ARIDE Sportswear & Accessories
- Is not a recognized brand
- Does not offer wide range of products
- Just few pieces of garment and some accessories like reflective bands
- Products done without a design process neither added value.

Photos taken from: Official facebook profile. This brand do not have official website.

FIERA Urban Cycling Clothes
- Aesthetic inspired in popular icons of bogotá city.
- Street and male style.

Photos taken from: Official facebook profile. This brand do not have official website.
CHAPTER 3

CHIC·LISTA

GRAN PEZ Clothes Printing
Specilized in printings and embroideries allusive to cyclism. Do not have accessories, just basic garment with special graphic design. Style more aggressive and male appearance.

Photos taken from: Bike Fest Official Site
This brand do not have own official website.

CUBRETE
Waterproof Clothes
Designs and produces exclusively waterproof garment for cycling. As well as “Anfibia” this brand do not produce accessories.

Photos taken from: Official Facebook Profile
This brand do not have own official website.

On the other hand, it is possible to find some brands that are more interesting and have more relation to CHIC·LISTA target that offers some products to satisfy the cyclist needs but still do not meet all of them. Also, in bogota does not exist an accessories brand that have sustainability as a strong component of collections, so in that way those brands explains below will be examples of design and kinds of accessories, but in terms of eco-friendly design them has not much to be example. Those brands are bolsonik, Cletta and 14 ocho miles.

14 Ochomiles: It is a Colombian brand, but is dedicated not as much as design and production but to sales of recognized brands of cycling accessories. Brands as ortlieb, bern and sms Santini are sold in this shop. In relation with CHIC·LISTA, those brands are more technical and are targeted to cyclism more sportive than urban. (14 ochomiles Photos)

Cletta bicycles: Beside 14 ochomiles is another Colombian brand dedicated to design, production and sales of bicycles and accessories for urban cycling. This brand is highly recognized specially for the bicycles that are own produced. In terms of accessories, offers wide quantity of padlocks, chains, baskets, helmets and others, but accessories like bags and that kind, just have one model of saddlebag for bikes. (Cletta Photos). This brand combines elegance with functionality and its target is cyclists for whom riding is a lifestyle. Sells saddles of Brooks brand but does not sell bags and accessories of this brand.

Bolsonik: It is the brand more in line with CHIC·LISTA in terms of sobriety of aesthetics and chic/elegant design. (Bolsonik Photos)

URBAN CYCLING

BEING URBAN CYCLIST

Photos taken from: “Revista mundo ciclistico” Official Site
www.revistamundociclistico.com
CHAPTER 3

CHIC·LISTA

CLETTA BICYCLES

Photos taken from: Cletta Bicycles Official Site
www.cletta.com.co/es/

BOLSONIK

Photos taken from: Official facebook profile
The official site of this brand is currently inactive.
www.bolsonik.monomi.co/

URBAN CYCLING

BEING URBAN CYCLIST
Through this important questions and the examples of the products offered by the market in Colombia, it is possible to find weaknesses in those brands, and find the way to turn its in opportunities for CHIC·LISTA project.

The most important thing is that none of those brands offers products designed for women, what means that women do not have the chance to fullfil their necessities of beauty and functionality, being limitted to consume the products of unisex aesthetics.

As explained before, in the survey information about folding bikes, its popularity has been growing in last years and that can be seeing in the bicycle shops where models “Tern - LINK B7” and “NODE D8” folding bikes are exposed and represents attraction for urban cyclists thanks to its versatility and practicity.

This let to determinate that CHIC·LISTA products are in a good way if designed for this kind of bicycles and to satisfy the functionality and beauty characteristics that are so importants for women cyclists.

So, knowing the existing products for urban cycling, is possible to see that most accessories are sportive style and mainly are accessories to add at the bikes, like saddles, baskets, lights, saddlebags, or others like helmets, lents and shoes, but there exist just few products that satisfy the needs of versatil products that let being transported both bicycle and ciclist, giving the women cyclist a chic and elegant style.

This is why after all this analysing and studing cycling, sustainability and oportunities in Bogotá -Colombia, which has growing data of urban cycling, has born “CHIC·LISTA” Sustainable accessories.
**STRENGTHS**

+ Design experience generates added value
+ It is clearly defined the potential customer target and style.
+ Quality (representing also sustainability) it is essential to CHIC·LISTA
+ Important contacts in the “Secretaría Distrital de Movilidad de Bogotá”
+ Important contacts in several groups and city cycling communities.

**WEAKNESSES**

- CHIC·LISTA is a new Brand which is not recognized yet
- No experience to entering in the market

**OPPORTUNITIES**

+ 23% of cyclist in Bogotá are women
+ Bogotá is one of the LAC cities that has more cycling infrastructure
+ Growth rates of cycling in urban areas
+ Less macho culture, more women cycling
+ More bicycle trips, fewer incidents.
+ Bogotá has “ciclovia” (Sunday from 7am to 2pm more than 120 km of exclusive streets for cycling and recreation)
+ Growing demand for portable bike, best choice for intermodal transport
+ Movements of cyclists and promotional activities of urban cycling

**THREATS**

- Insecurity issue is relevant to the city cyclists

**3.2.1.2 SWOT Matrix**

**Conclusions market strategy**

This SWOT matrix is used to identify characteristics of the CHIC·LISTA project and the context in which has been designed. This is the reason why it has been identified internal aspects in terms of strengths and weaknesses, and external aspects related to opportunities and threats found in the context of urban cycling in bogotá city.

Thanks to this, has been possible determined strategies to overcome obstacles, improve the good aspects of CHIC·LISTA, transform weaknesses into positive aspects, and take advantage of opportunities and strengths to include this project in a real market.

This strategies are mainly the good practices to effort and improve the entrance of CHIC·LISTA into a new market in Bogotá and Latin American Cities.

Those include partnerships with stores and groups that promotes urban cycling, as well as make known the CHIC·LISTA project at the cycling community in Bogotá through participation in promoting activities, explaining the advantages of cycling as a healthy and sustainable activity, and sharing the characteristics and added value of the products of CHIC·LISTA sustainable accessories for urban cycling, encouraging each day to more women use bike to go to work keeping their chic and female style.

**STRATEGIES**

**OPPORTUNITIES**

* Partnering with stores that already have good reputation (“Cletta Bicycles” and “14 ochomiles”)
* Spread through groups and cycling communities, the CHIC·LISTA project and its sustainability.

**STRENGTHS**

* Use a good design, innovative and aesthetically according to eco-chic customer, to promote the brand.
* Promoting from design, the quality consumption and sustainability
* Use the contacts to making know the CHIC·LISTA brand

**WEAKNESSES**

* Use a good design, innovative and aesthetically according to eco-chic customer, to promote the brand.
* Promoting from design, the quality consumption and sustainability
* Use the contacts to making know the CHIC·LISTA brand
4.1 CHIC·LISTA Concept

4.1.1 The brand

The naming of the project has been determined with a conscious choice of words to be combined in order to create a brand that expresses the essence of the project.

After brainstorming processes and divers name options, CHIC·LISTA has been chosen as name of this project. This name encloses and meets important concepts for the collection of sustainable accessories for female urban cyclist that loves fashion and chic style.

The name CHIC·LISTA sounds like the Italian word “ciclista” which means cyclist. This choice is to honor the geographic origin of this collection, a project held in the context of a Master course in Milan - Italy.

The name is composed by two parts separated by an interpunct. Each part represent the two wheels of a bicycle, and the interpunct is not just a separation element but linkage of those elements to give a whole meaning to the word and evoke folding bicycles.

CHIC = An international expression representing elegance, love for fashion. In the project means the style of the female urban cyclist who uses the bike with elegant attire to go to work.

LISTA = This word in Spanish language have several meanings, but for this case refers to two things.

“Lista” as a woman ready to do something. For the present project is the woman ready to act in a healthy and sustainable way, using their bicycles in order to keep healthiness and act in an eco-friendly way helping to avoid and reduce contamination in cities.

“Lista” as a regular long and narrow strip of various materials, used often as complementary or ornamental functions in a cloth or fabric. The strip in the project reflects the streets and regular components of the urban contexts, the bike paths in cities, the lineal mark that cyclists leaves when are riding and that brings them to live lot of experiences in their bikes.

In conclusion CHIC·LISTA encloses cycling, women, sustainability, urban context, as well as involving three languages which acquire important meanings: English referring to a project internationally available. Italian that refers to the origin of the project, and Spanish in reference to the mother tongue of the author of this project and the official language in Bogotá city which has been determined as the city where CHIC·LISTA project will be launched.
CHAPTER 4
CHIC·LISTA PROJECT
CONCEPT

ECO-FRIENDLY
SUSTAINABLE
URBAN CYCLING
CREATIVE
VERSATILITY
WOMAN
DAY
ACCESSORIES
FUNCTIONAL
CHIC·LISTA
SUSTAINABLE
WORK
NIGHT
PRACTICITY
LIGHT STRIPES
SECURITY
TRACKS
Ciclo inclusion en America Latina y el Caribe. Guía para impulsar el uso de la bicicleta. Banco Interamericano de Desarrollo BID. 2015

Bogotá urban cyclist survey, femmale gender. Rodriguez Ximena. 2015


Cycle More Often 2 Cool Down the Planet. Quantifying CO2 savings of cycling. European Cyclists Federation.2011


Velo, Bicycle culture and design. Robert Klanten and Sven Ehmann. 2010


Techno textiles 2. Revolutionary fabrics for fashion and design. Sarah E. Braddock Clarke and Marie O’Mahony. 2007


CHAPTER 6

www.americanhistory.si.edu
America on the move
The Development of the Bicycle

www.popchartlab.com
Pop Chart Lab: The evolution of Bicycles.

www.ecf.com
The European Commission - Health and Environment

www.xcriticalmass.org
San Francisco Critical Mass.

www.tweedrun.com
The Tweed Run - A bit of History

www.n-e-r-v-o-u-s.com
Nervous System's Kinematics Collection.

www.kickstarter.com
Electroloom - The World's First 3D Fabric Printer

www.dezeen.com
DeZeen Magazine

www.blondandbieber.com
Blond & Bieber - Algaemy

www.domusweb.it
The electroloom / Faber Futures

www.medium.com
Electroloom blog

www.thisisalive.com
Faber futures

www.eventbrite.com
Faber Futures

www.noctulachannel.com
Fruitleather Rotterdam

www.odditycentral.com
Fruitleather Rotterdam

www.metro.co.uk
Fruitleather Bag

www.bolsonik.monomi.co/
“Bolsonik Accesorios”

www.cletta.com.co/es/
“Cletta Bicycles”

www.stellamccartney.com
Sustainability

www.ecouterre.com
Microbial Leather
Faber Futures

www.ananas-anam.com
Piñatex

www.fruitleather-rotterdam.com
Fruitleather Rotterdam

www.orangefiber.it
Orange Fiber. Filati vitaminici

www.activeandeco.com
Piñatex – new materials for a new world

www.sfcriticalmass.org
San Francisco Critical Mass.

www.odditycentral.com
Fruitleather Rotterdam

www.eltiempo.com
“Industria nacional será el sector estrella de 2016”

www.thomaskrag.com
Thomas Krag Mobility Advice

www.ucsdnews.ucsd.edu
“Reaching for the Sky - Campus rooftops serve as launch pads for sustainability efforts”

www.ucsdnews.ucsd.edu
Factsheet Nederland Fietsland 2015

www.mdpi.com
Sustainability — Open Access Journal

www.sustainability-lab.net
Sustainability-Lab

www.urbanvelo.org
Urban Velo | Bicycle culture on the skids.

www.americanhistory.si.edu
America on the move
The Development of the Bicycle

www.popchartlab.com
Pop Chart Lab: The evolution of Bicycles.

www.ecf.com
The European Commission - Health and Environment

www.xcriticalmass.org
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www.tweedrun.com
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Electroloom - The World's First 3D Fabric Printer

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DeZeen Magazine

www.blondandbieber.com
Blond & Bieber - Algaemy

www.domusweb.it
The electroloom / Faber Futures

www.medium.com
Electroloom blog

www.thisisalive.com
Faber futures

www.eventbrite.com
Faber Futures

www.noctulachannel.com
Fruitleather Rotterdam

www.odditycentral.com
Fruitleather Rotterdam

www.metro.co.uk
Fruitleather Bag

www.bolsonik.monomi.co/
“Bolsonik Accesorios”

www.cletta.com.co/es/
“Cletta Bicycles”

www.stellamccartney.com
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www.ecouterre.com
Microbial Leather
Faber Futures

www.ananas-anam.com
Piñatex

www.fruitleather-rotterdam.com
Fruitleather Rotterdam

www.orangefiber.it
Orange Fiber. Filati vitaminici

www.activeandeco.com
Piñatex – new materials for a new world

www.eltiempo.com
“Industria nacional será el sector estrella de 2016”

www.thomaskrag.com
Thomas Krag Mobility Advice

www.ucsdnews.ucsd.edu
“Reaching for the Sky - Campus rooftops serve as launch pads for sustainability efforts”

www.ucsdnews.ucsd.edu
Factsheet Nederland Fietsland 2015

www.mdpi.com
Sustainability — Open Access Journal

www.sustainability-lab.net
Sustainability-Lab

www.urbanvelo.org
Urban Velo | Bicycle culture on the skids.