



Business Innovation Observatory



Servitisation

Pay-per-use

Case study 67

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Business Innovation Observatory
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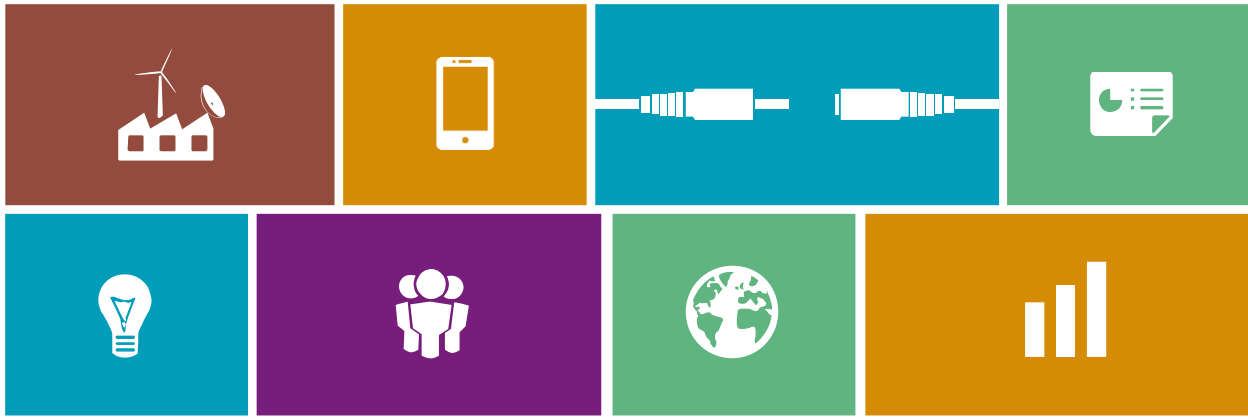
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1. Executive summary

Pay-per-use includes any type of payment structure in which the customers have unlimited access to resources but only pay for what they actually use, or for the result linked to their use. This indicates a transition from selling products to selling services.

Pay-per-use services are gaining popularity as they allow customers to access products matching their fluctuating needs. In more complex forms, they involve innovative pricing schemes that reflect not the costs of the use of the product, but of the steps involved in delivering a specific outcome linked to the product. These models go beyond the mere renting or leasing of products by bundling services together with the product as part of a consumer-facing integrated solution.

The market potential for servitisation models is very promising. The **proportion of worldwide manufacturers using performance-based service contracts is set to increase to 65 per cent in 2015**, and more than 70 per cent of manufacturers are expected to use services as a key product differentiator. Research has further revealed that early adopters of servitisation models have experienced an **annual business growth of 5 to 10 per cent**, with services potentially generating 50 per cent of revenues. Moreover, pay-per-use's potential to **contribute to the circular economy** in the form of the efficient management of resources, increased recycling and reduced waste is also compelling. Usage-based payment models further incentivise companies to focus on longevity and greater durability built into their products in order to maximise product lifecycles and thus profits, and create affordable access to traditionally costly products.

In the face of a rising uncertainty in revenue streams, competition from low cost countries and factor price volatility, companies are increasingly looking towards **more**

cost effective means to operate their businesses, while finding ways to become competitive and differentiated in their offer. This is driving both the provision of as well as demand for servitisation offerings. Furthermore, **technologies such as cloud computing, the Internet of Things and Big Data analytics** are paving the way for innovative business process and service innovations. Finally, **increasing government pressure on companies to reduce their carbon footprint, and increased consumer environmental awareness** are also driving the demand for more environmentally-friendly solutions and offerings.

However, traditional mindset is one of the biggest barriers to pay-per-use models – companies often experience cultural resistance towards innovative leasing and lifecycle service propositions. Customers, both corporate and individual, **tend to perceive the cost of usage as higher than the cost of ownership**, and are sometimes not willing to pay significant premiums for higher quality service. Some companies have also faced **challenges in addressing privacy and trust concerns** relating to the use of Internet-enabled technologies. **Traditional procurement rules and balance sheet constraints** are favouring traditional purchasing behaviours. SMEs in particular face challenges relating to the **increased bearing of performance risk as well as large upfront capital investments**.

What can be done to overcome those barriers? Policymakers should support shift towards products and services that fulfil circular economy principles, as well as reward models that provide access over ownership. This could mean **introducing positive legislative drivers** that fulfil circular economy principles, as well as **incentives to encourage eco-positive products and services**. Procurement rules should also be updated to encourage an **outcome-based**



approach to purchasing. Furthermore, tax and regulations should be updated to reflect access-based consumption and provide an **equal playing field between related services.** To help ease the initial financial burden on SMEs, **funding**

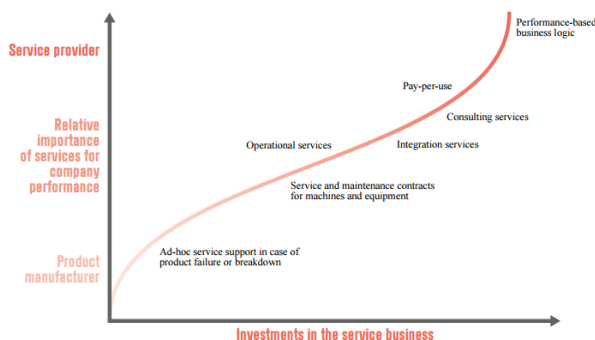
support could be provided for early stage capital investments. Finally, governments could support in **spreading information and awareness** on the total cost of ownership versus paying for use, for example through the use of product labelling.

2. Pay-per-use

2.1. Trend presentation

Pay-per-use, sometimes referred to as pay-as-you-go, metered services, product-as-a-service, or consumption-based pricing, includes any type of payment structure in which the customer has unlimited access to resources but only pays for what they actually use, or for the result linked to their use. This indicates a transition from selling products to selling services, for example, providing customers with washing machines at a price-per-wash, as opposed to selling the washing machine itself, and is thus one of the business models emerging in servitisation.

Figure 1: Moving from product manufacturer to service provider



Source: Avlonitis, Frandsen, Hsuan & Karlsson¹

Pay-per-use services are gaining popularity as they allow customers to access products to match fluctuating needs. In their more complex forms, they involve innovative pricing schemes that reflect not the costs of the use of the product, but of the steps involved in delivering a specific outcome linked to the product (Figure 2).

This includes other services linked to the use of the product, such as customer support and advice. An example is utility computing where the service provider makes computing resources and infrastructure management available to customers when they need it and charges them for specific use, as in the case of Rendicity which provides cloud-based access to high performance computing.

Figure 2: Pay-per-use shifts focus from the product to results

Type of Servitization	Characteristics	Examples
Product Oriented	<ul style="list-style-type: none"> The business model is still mainly geared towards sales of products, but some extra services are added 	<ul style="list-style-type: none"> Product related services Advice and consultancy
Use Oriented	<ul style="list-style-type: none"> The product stays in ownership with the provider, and is made available in a different form, and sometimes shared by a number of users 	<ul style="list-style-type: none"> Product lease Product renting or sharing Product pooling
Result Oriented	<ul style="list-style-type: none"> The client and provider in principle agree on a result, and there is no pre-determined product involved 	<ul style="list-style-type: none"> Activity Management/Outsourcing Pay per service unit

Source: Copenhagen Business School²

There are a variation of usage-based payment schemes which shift away from traditional product ownership towards payment for the use of services or achievement of outcomes, and these include:³

- Pay per service unit:** The customer is charged for each time the service is used. In turn, the service provider is responsible for all life cycle costs and is thus incentivised to design a product optimised for usage, maintenance, reuse of parts or product, remanufacture and recycling. Examples include Rolls-Royce offering TotalCare on gas turbines for their airline customers based on a 'fixed dollar per flying hour'; Xerox delivering 'pay-per-click' scanning, copying and printing of documents⁴; Michelin invoicing tires on the basis of per kilometre travelled, per tonne carried, or per landing, while retaining responsibility over repairs and maintenance⁵; Philips' 'pay per lux' model that charges only for the actual amount of consumed light (lux)⁶; Bundles charging customers on a 'pay per wash' basis; Rendicity charging customers by the hour, with the price based on the number of machines, type of machine and desired software.
- Product renting or sharing:** The customer pays to access the product for a certain period and other customers sequentially use the product. The product is provided, controlled and maintained by the provider. An example is Move About, an electric vehicle car sharing scheme that charges customers based on hourly usage.



- Product lease:** The provider retains ownership while the customer has continuous access to the product. The provider typically controls, maintains and collects the product at the end of the leasing agreement. An example is MUD Jeans, where jeans are leased to the customer based on a monthly subscription and are returned to MUD Jeans when the customer decides to end the lease.

These models go beyond the mere renting or leasing of products by bundling services together with the product as part of a consumer-facing integrated solution. For instance, both MUD Jeans and Bundles offer free product repairs as part of the subscription package.

The practice of servitisation is thus shifting the primary perspective of manufacturers from the product or service itself to the overall customer experience.⁷ In some cases this has resulted in an effective hedge against cost volatility as well as increased customer loyalty. For example, Vodafone’s Red-Hot plan allows customers to rent latest phone models for a year with the option of exchanging it for a newer version, thus encouraging customers to return.⁸

The concept of paying for usage is also linked to circular economy principles, where durable products are leased, rented or shared wherever possible instead of being bought and consumed. As such, pay-per-use models could result in resource savings because if products are charged per use rather than sold, vendors and manufacturers are incentivised

to prolong the life of the product as long as possible in order to maximise its use. This may lead to fewer products being produced, thus creating significant resource and energy savings as well as reductions in emissions.⁹

Product-as-service models are thus transforming consumers into users, which would not only allow companies to retain product ownership for easier repair, reuse and remanufacture, but might result in producer responsibility obligations being extended to users as part of the purchase agreement.¹⁰

Pay-per-use models are further prevalent in the collaborative economy, such as in vacation rentals (paying by usage for unused housing capacity) and personal transportation (as in the example of Move About), but also span other sectors like auto insurance which has begun to offer pay-as-you-drive policies, thus billing customers only for the time they actually spend behind the wheel. Such usage-based insurance can potentially lower premiums by up to 50%.¹¹ Accordingly, pay-per-use and “access over ownership” models seem particularly suited for industries where traditional assets and products often experience either limits on utilisation levels (thus justifying consumption on demand as opposed to a lumpsum upfront investment) or frequent product updates as driven by consumer preferences (as in the case of Vodafone’s renting of phone models as well as MUD Jean’s leasing of jeans).

2.2. Overview of the companies

The following section describes four innovative startups which feature pay-per-use as a key component to their service offering.

Table 1: Overview of the company cases referred to in this case study

Company	Location	Business innovation	Signals of success
Bundles	Netherlands	Bundles offers a service to produce clean laundry in homes on a pay-per-wash basis, so customers pay for the performance, not the product. It links quality washing machines and dryers to the Internet and works with the customer to reduce overall washing costs. It charges customers a monthly subscription fee and usage on a per-wash basis, while the company retains ownership of the appliances.	<ul style="list-style-type: none"> It has received approximately EUR 800,000 in financing from Rockstart Accelerator and crowdfunding initiatives. It operates 166 appliances from the brand Miele at 130 households across the Netherlands. The company has four employees and generated approximately EUR 25 000 in revenues in 2015.



MUD Jeans	Netherlands	MUD Jeans leases out jeans for a monthly fee, and after 12 months customers are given the option of trading in the existing pair of jeans for a new pair at a slight discount. During the leasing period, jeans are repaired for free. Returned jeans are upcycled or recycled into new pieces of clothing.	<ul style="list-style-type: none"> • It has operations in the Netherlands, Germany and Norway, with 2,000 leasing customers and 10,000 visitors to its website without any external marketing. • It partners with 30 retail stores who are selling MUD Jeans, and has suppliers in Tunisia, Italy, Turkey and Egypt. • The company has six employees with a turnover of EUR 200 000 in 2015.
Move About	Sweden	Move About has developed a set of customer focused products, services and processes to enable car sharing with electric vehicles, allowing private and corporate users to reduce their carbon footprint and experience significant cost savings compared to vehicle ownership.	<ul style="list-style-type: none"> • It has operations in Norway, Sweden, Denmark and Germany, with a fleet of more than 100 electric vehicles. • KPMG, Microsoft, Statkraft, Chalmers, ABB, SP, Entra Eiendom and various municipalities are among its customers. • It has more than 3,000 users and members in Sweden, and more than 5,000 members in Norway. • It has received investment capital several times, and is now growing organically without need for additional capital. • It has approximately 13 full-time staff in Sweden, Norway and Germany.
Rendicity	Ireland	Rendicity allows customers to create cloud render farms on demand. It provides end users of applications requiring intensive computer power with access to high performance computing power via the cloud on a pay-per-use basis and with a user friendly interface.	<ul style="list-style-type: none"> • It has over 40 customers worldwide. • It has received approximately EUR 200,000 in investments from Enterprise Ireland, the 30/60 Partnership and the DCU Ryan Academy. • Rendicity won the company of the year award for 2015 at the Ryan Academy's Propeller Venture Accelerator programme for entrepreneurs. • It secured a EUR 20,000 cash prize and was named the Best Early Stage company at the Munster final of the 2015 InterTradelreland all-island Seedcorn Investor Readiness competition in November 2015. • It has two employees and aims to increase its staff size to 21 by end of 2016.¹²

Problem 1 – The improper use of washing machines is leading to unnecessary water and energy wastage. The purchasing of cheap and short-life washing machines by cost-conscious households is also negatively impacting the environment in the long run.

Innovative solution 2 – Bundles offers a service to produce clean laundry in homes on a pay-per-wash basis, so customers pay for the performance, not the product. It links quality washing machines and dryers to the Internet and works with the customer to reduce overall washing costs. It charges customers a monthly subscription fee and usage on a per-wash basis, while the company retains ownership of the appliances.

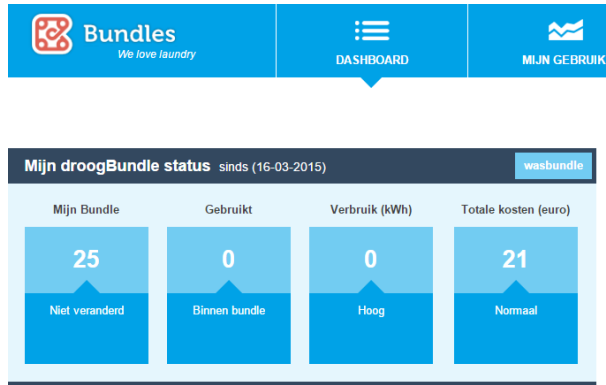
Bundles thus gives customers access to more effective and energy-efficient machines which they might otherwise have

not been able to afford to purchase. By leasing them instead, customers can save on energy costs without the initial investment involved in buying superior quality white goods.

Bundles' service offering not only reduces the demand for cheap and short-life appliances, but also provides customers with the opportunity to use water and energy wisely. Customers have access to a high level of appliance usage-information, allowing them to optimise their use of the appliance in order to avoid energy wastage and get better results. Customers can assess how many cycles they need and chose a monthly payment package accordingly. The monthly subscription also includes access to offsite engineers via video for advice on using the appliance, as well as free installation and maintenance services.



Bundles' Wash App provides usage information and personal tips for optimising washing performance, allowing customers to consume less energy and detergent while obtaining clean washes. For example, the app's personal dashboard shows information on subscription status, energy consumption and overall washing costs.



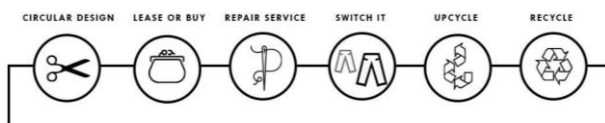
Source: Bundles¹³

Problem 2 – Fast fashion is encouraging consumers to frequently purchase unnecessary clothing, leading to high levels of waste in the fashion and clothing industry, with around 30 per cent of garments in a wardrobe not worn each year.

Innovative solution 2 – Instead of just selling fair trade jeans made from recycled material and organic cotton at a cost of EUR 100 per pair, MUD Jeans offers its customers the option to rent their jeans instead, at a monthly fee of EUR 7.50. During the rental period, the jeans are repaired for free, and customers can retain the jeans for as long as desired, swap for a new pair and continue on the monthly rental, or return the jeans at the end of the rental period. For those who have decided to keep the jeans, the company offers financial incentives to return the garment to encourage recovery. Customers are thus able to consume new fashion in an environmentally-friendly way.

This “lease-a-jean” service was launched with the aim of incentivising the return of jeans at the end of use, so that MUD Jeans can re-lease the jeans or upcycle/recycle them into new items such as knits or sweats. The renting out of jeans has also served to provide the company with a degree of protection from fluctuating cotton prices.¹⁴

MUD Jeans provides a high quality, sustainable and eco-friendly approach to denim by leasing out jeans at a monthly fee and recycling returned jeans.



Source: MUD Jeans¹⁵

Problem 3 – The cost of car ownership, particular for electric vehicles, is high, while both privately and corporately owned cars are often left idle and their use not optimised.

Innovative solution 3 – Move About enables car sharing (moving away from private car ownership towards serviced vehicle use) with electric vehicles – thereby combining two of the biggest trends in the transportation sector. Move About operates car sharing services for the general public, as well as closed systems to corporate customers, and has almost 100 electric vehicles in operation in Norway, Sweden, Denmark and Germany.

Move About’s mobility solution allowing companies to significantly reduce their carbon footprint and need for employee parking, while offering significant cost savings compared to taxis or individual vehicle ownership. For a fixed monthly cost, Move About provides complete financing and service, including 24/7 access to dedicated vehicles; 24-hour roadside assistance; a web-based vehicle booking system; individual contact-less access cards; vehicle insurance; maintenance and service; change to summer / winter tires; etc. It also offers pay-as-you-go options depending on hourly usage.

Move About offers its customers a hassle-free pay-as-you-go environmentally-friendly mobility solution.

- 1: Beställ bil**
Logga in på webbsidan och ange när och var du vill hämta bilen. Lämna medlem ännu? – Du blir enkelt medlem under rubriken "Bli medlem".
- 2: Hämta bilen på närmaste station**
Läs upp bilen genom att svara med din personliga PIN-kod på det SMS du får vid bokningens början, alternativt hålla ditt personliga nyckelkort över vindrutan, nedest på vänster sida. Nyckeln sitter i en hållare i handskfacket och bilen är klar att köra.
- 3: Dra ut laddkabeln**
Dra ut laddkabeln och ta med den i bilen.
- 4: Kör!**
Sätt dig i bilen, ta på dig säkerhetsbälte, starta bilen. Ha en god tur!
- 5: Olycka eller haveri?**
Ring Move About på 031-759 28 04. Lokala aren den kopplas vidare.
- 6: Lämna tillbaka bilen och sätt den på laddning**
Ta med dig personliga ägodelar, och lämna bilen i samma ställe som när du hämtade den. Kom ihåg att sätta bilen på laddning, så att den har tillräckligt med ström för nästa kund.

Source: Move About¹⁶

Problem 4 – Access to high-performance computing (HPC) is costly and complex, requiring investments in specialised ICT infrastructure and support staff. In turn, the majority of firms using compute-intensive applications have not considered using HPC due to concerns relating to cost, complexity and convenience.

Innovative solution 4 – Rendicity provides end users of applications requiring intensive computer power with access to HPC power via the cloud on a pay-per-use basis and with a user friendly interface. Rendicity’s service is an on-demand, drag-and-drop solution which offers users access to a range of public cloud service providers such as Microsoft and Amazon Web Services, providing near-infinite state-of-the-art computing power at real-time industry pricing using a utility-billing model. Its market entry use



case allows customers to create cloud-based render farms on-demand. Rendicity can also be used for other loosely-coupled use cases such as computational fluid dynamics and finite element modelling.

Compared to existing HPC solutions, Rendicity's offering is said to be more secure, affordable and convenient, without requiring significant upfront capital expenditure or deep and specialised IT knowledge. This makes the solution attractive to SMEs with limited budgets and resources, as well as high-volume users who often encounter capacity issues in the face of tight deadlines and surge workloads.¹⁷

Rendicity offers usage-based access to HPC, with its farms priced per hour and based on the number of machines, type of machine and desired software.



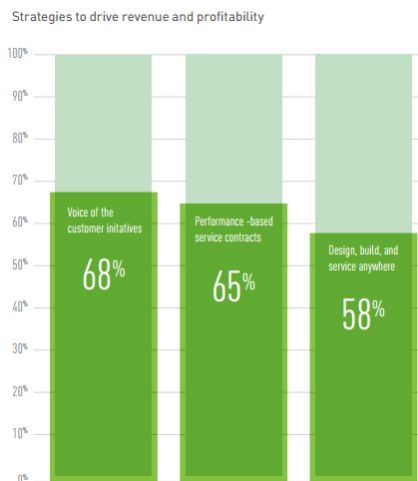
Source: Rendicity¹⁸

3. Impact of the trend

3.1. The market potential of the trend

As mentioned in case study 66 on service and predictive maintenance contracts, servitisation is set to grow in popularity. By 2015, the proportion of **manufacturers worldwide using performance-based service contracts is set to increase to 65 per cent**, and more than 70 per cent of manufacturers are expected to use services as a key product differentiator (Figure 3).¹⁹

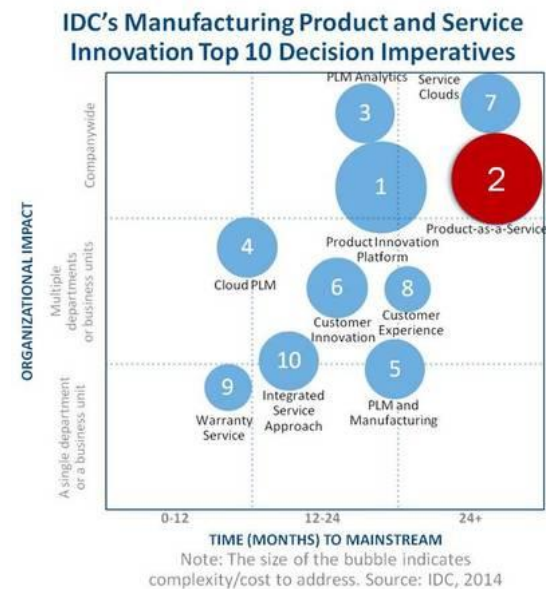
Figure 3: Performance-based service contracts is one of the top three strategies identified by manufacturers to drive revenue and profitability



Source: Oxford Economics²⁰

IDC also estimates that by 2018, 40 per cent of the top 100 discrete manufacturers and 20 per cent of the top 100 process manufacturers will provide products-as-a-service platforms where manufacturers transition from selling physical products to the business outcomes that the products will deliver (Figure 4).²¹

Figure 4: Manufacturers are shifting to providing products-as-a-service platforms



Source: IDC²²

Research by Xerox and Aston Business School has further revealed that early adopters of servitisation models have experienced an **annual business growth of 5 to 10 per cent**, with services potentially generating 50 per cent of revenues.²³ The benefits are not just on the producer side – the same study found that **servitisation reduces costs of up to 30 per cent** for manufacturing customers by helping them simplify business operations and streamline labour-intensive processes.

Pay-per-use's potential to contribute to the circular economy in the form of the efficient management of resources, increased recycling and reduced waste is also compelling from an economic perspective. The **disposable income of European households by 2030 is estimated to be as**



much as 11 per cent higher in a circular economy, relative to the current development path.²⁴ Under the Waste & Resources Action Programme's Circular Economy 2020 Vision, the European Union (EU) could benefit from an improved trade balance of EUR 128 billion and the creation of 160,000 jobs. In particular, given their reliance on raw materials, a subset of the EU manufacturing sector could potentially realise net materials cost savings worth up to EUR 595 billion per annum by 2025.²⁵ In the UK alone, each tonne of clothing that is collected and sorted can potentially generate gross profits of EUR 1,224 from reuse opportunities.²⁶

3.2. Environmental impact

According to Richard Girling's book *Rubbish!* published in 2005, 80 per cent of products made get thrown away within the first six months of their life.²⁷ Pay-per-use models could help stabilise some of these issues by **decoupling economic growth from resource consumption**²⁸, as well as **encouraging the efficient and responsible use of resources**. For example, for every car in a car sharing scheme like Move About, between 5 and 7 privately owned cars could be replaced, and an average member of a car sharing club drives on average about 30 per cent less than with own car. Car sharing customers also tend to optimise their (much more visible) direct costs and avoid unnecessary

"Bundles provides personalized insights and engaging messages that help the customer to understand the impact of their washing habits and give him/her the tools to change it."

– **Bundles**

personalised insights through Bundles' Wash App to further reduce energy and water consumption.

In addition, pay-per-use providers may **support the use of environmentally-friendly products** that positively impact the environment. For example, cars offered by a car sharing service are generally much newer (maximum of 3 years old in the case of Move About), compared to the average age of a private car fleet in Sweden of 9 to 19 years – which means

better emission performances than older cars.³⁰ MUD Jeans are made with 30 per cent recycled content and 70 per cent organic cotton.

As the company Patagonia says, "Consume less, and consume better."

– **MUD Jeans**

Cloud-based services like Rendicity also have the potential to **reduce companies' carbon footprints and electricity bills**. It is estimated that the world's 1.5 billion computers consume about 90,000 MW of electric power, comprising 10 per cent of global consumption. Subscription to public clouds via platforms like Rendicity enables organisations to spend less on electricity for powering and cooling their computing hardware, and allow them to save on space needed to house IT infrastructures and resources.

3.3. Transformative power of the trend

Usage-based payment models incentivises companies to **design for longevity** and seek for greater durability to be built into products in order to maximise product lifecycles and thus profits. As noted by Ellen MacArthur, who founded the Ellen MacArthur Foundation dedicated to the circular economy, when a customer pays per wash when it comes to washing machines instead of owning one, the manufacturer becomes incentivised to build a better machine.³¹

Shifting from ownership to usage-based models further allows for **affordable access to traditionally costly products**, effectively creating a new customer base across industries. Rendicity provide access to high performance computing; Move About, electric cars; MUD Jeans, fair trade organic cotton jeans; and Bundles, high-end white goods like Miele's washing machine that costs approximately 50 per cent more than an average washing machine. Such access can encourage the uptake and experience of new and innovative products without the high upfront costs that are typically required in traditional consumption and ownership schemes. This would not only serve to facilitate the uptake of performance-enhancing technologies such as ICT, but could also benefit SMEs for which high investment costs normally present a challenge.

Electric cars are expensive as an asset, but cheaper per kilometer to run as the fuel is more cost efficient.

– **Move About**



4. Drivers and obstacles

4.1. Concerns relating to cost and business competitiveness are facilitating the shift to servitisation

The current global competitive environment is putting pressure on economic margins in the face of a rising uncertainty in revenue streams, competition from low cost countries and factor price volatility. As such, businesses are increasingly looking towards more **cost effective means** to operate their businesses, while finding ways to become **competitive and differentiated in their offerings**. This interplay between “defensive” and “offensive” drivers is what researchers at Aston Business School have found to contribute to the adoption and offering of products-as-services.³²

Shifting from ownership to pay-per-use is creating cost reductions for customers through initial cost savings and the conversion of fixed asset costs into predictable variable costs. In fact, cost benefits for customers can be substantial with pay-per-use given that the supplier of the service takes care of the technology risk and the investment in return for a long-running lease agreement. In turn, the provider, through servitisation, can build unique relationships with clients and enhancing customer loyalty, as well as innovate faster since they are closer to the customer and will understand their needs better.

Figure 5: Drivers of service strategies are both offensive and defensive

	Customers	Providers (OEMs)
Defensive Improvements in business efficiencies, cost savings and financial predictability	<p>Seeking to improve financial, risk and asset management, through:</p> <ul style="list-style-type: none"> Initial cost savings Ongoing cost reduction Transfer of fixed costs into predictable variable costs Improved asset security Improved asset reliability 	<p>Seeking to improve commercial viability through:</p> <ul style="list-style-type: none"> Response to customer demand Competitor lock-out Smooth revenue streams Response to legislation Product life-cycle extension
Offensive Improvements in business competitiveness, focus and growth	<p>Seeking to improve focus and investment through:</p> <ul style="list-style-type: none"> Focus on core competences Higher capital investment Advanced technology adoption and access to associated skills 	<p>Seeking to improve growth through:</p> <ul style="list-style-type: none"> Greater customer intimacy (understanding customer operations / developing relationships) Market adoption of product innovations Market adoption of business process innovations

Source: Ashton Business School³³

Cost consciousness is also a feature of the individual consumer, which may explain why today’s users are increasingly displaying a preference for access over ownership, i.e. services over products. The World Economic Forum believes that this may have originated in necessity, driven by the depressed economy and widespread youth under or unemployment.³⁴ This may have therefore led to what is commonly known as the sharing or on-demand economy, where consumers embrace services that enable them to access products on demand rather than owning them, thus becoming users.

4.2. Technology facilitates innovative service offerings

Technologies such as cloud computing, the Internet of Things and Big Data analytics are paving the way for innovative business process and service innovations as well.

Rendicity offers end users access to a range of public cloud service providers via a user-friendly interface, thus remotely connecting users to high performance computing infrastructure that would have traditionally resided as a costly fixed asset in the physical premises of a company.

Rendicity’s solution provides an assurance that you can meet your deadline ... our service allows you to scale pretty much to infinity, on demand, using state of the art technology, instead of relying on your own infrastructure which can hit capacity and turn obsolete very quickly.

- Rendicity

Bundles connects its appliances to the Internet via sensors to gather appliance usage data and then translates this information into messages for its user, technicians or suppliers for improved utilisation of the appliance, predictive maintenance, and future product development. The data enables customised performance tweaks and continuous improvement, optimising machine load, cycle duration, temperature and detergent use.³⁵ Bundles is an example of how the Internet of Things via the incorporation of sensors and actuators in machines can provide remote maintenance and continuous information, a type of service increasingly being offered (see case study 66 for more information on service and predictive maintenance contracts).

4.3. Environmental concerns are a driving force

There is **increasing government pressure on companies worldwide to reduce their carbon footprint**. For example, the EU Energy Using Products Directive is aiming to



lower the environmental impact caused during the manufacture, use and disposal of a broad range of products (except vehicles for transport). In the UK, its Carbon Reduction Commitment (recently renamed the Energy Efficiency Scheme) aims to reduce carbon emissions within the country by 60 per cent by 2050, in comparison to 1990 levels.³⁶ In December 2015, the European Commission adopted a new, more ambitious circular economy strategy that will serve to transform Europe into a more competitive resource-efficient economy, addressing a range of economic sectors, including waste.³⁷

Increased consumer awareness of the environment is also driving the demand for more environmentally-friendly offerings. In a global study by Tetra Pak, two-thirds of surveyed consumers chose to buy environmental products, even if they cost more, while the same proportion avoided specific brands or items due to environmental concerns.³⁹

I worked in China and saw the horrible effects of the fast fashion industry. When I moved back to the Netherlands I wanted to continue to work in the textile industry, but knew I had to do things differently. Lease A Jeans began as an experiment. The media picked it up very quickly. This is when I knew I had something special in my hands.
– MUD Jeans³⁸

This same awareness and concern for the environment was in fact what spurred the founders of Move About, Bundles and MUD Jeans to start their respective companies, in a bid to encourage responsible consumption and the efficient use of resources.

As such, pay-per-use models will become increasingly prominent as a circular economy tool that encourages longer product lifespans (and thus less products produced) and increased rates of reuse, remanufacturing and recycling.

4.4. Cracking the mindset conundrum is key

Institutionalised ways of working and thinking are one of the hardest barriers to break down – with companies often experiencing cultural resistance towards innovative leasing and lifecycle service propositions. Customers, both corporate and individual, tend to **perceive the cost of usage as higher than the cost of ownership**, and are sometimes not willing to pay significant premiums for higher quality service.

In the case of car sharing services like Move About, customers tended not to think about the total costs of ownership of private vehicles and thus perceive the cost of car sharing services to be high. Particularly among new customers, lack of experience in the use of car sharing services made it difficult for them to think in terms of how much the improvements provided by the services are worth.

⁴⁰ Bundles also faces the same problem in relation to mindsets about the ownership and use of washing machines.

Accordingly, the ease and transparency in understanding and comparing the total cost of pay-per-use models versus traditional ownership models, including the benefits of bundled services such as repair and maintenance that the customer would have otherwise needed to bear separately, is crucial in addressing these mindset barriers.

Changing behaviour is always a challenge, especially in the transport sector where there are very strong habits – you are very used to having your own car. There is only one big competitor – and that is the tradition of owning cars.
– Move About

Companies like Rendicity and Bundles have also faced challenges in **addressing privacy and trust concerns**, a common issue for companies operating in the Internet of Things and cloud computing space. They believe that there continues to be a need for education and awareness raising in order to overcome such perceptions relating to data ownership and privacy. For instance, when clients use Rendicity’s rendering service, their data is only resident in the cloud for the lifetime of their farm. While Rendicity can see that a job is happening, it does not have access to the data without the consent of the client. In effect, Rendicity leverages the public cloud service provider’s security infrastructure and trust.

Almost every customer initially responds with ‘This is too expensive.’ And then when you ask why, they say it’s because it’s rental. So they don’t understand what ‘pay-per-use’ means. It’s counter intuitive.” – Bundles

4.5. Procurement, tax and accounting favour traditional business models

Some companies find that **traditional procurement rules and balance sheet constraints** are hindering the purchasing of products-as-services. The CEO of Royal Philips noted that current tendering rules did not allow municipalities to purchase lighting as a service. In turn, many do not upgrade to energy efficient lighting because it would have to come out of a capital budget instead of an operating one.⁴¹

Companies like Move About are also frustrated **with tax rules that favour competing services** (in the case of car sharing, a competing service is taxi rides) and which have not yet been updated to reflect the usage-based consumption model of car sharing services.

In Sweden, for example, we pay 25 per cent VAT for car sharing, while we pay 6 per cent VAT for taxis, which is quite silly. Why should we pay 25 per cent VAT for car sharing, and 6 per cent for riding taxis?
– Move About



Further, **VAT requirements add to cash flow concerns** for companies like MUD Jeans, which have to pay an entire year's worth of VAT upfront when the pair of jeans is first leased to the customer, while only being able to collect the VAT from the customer on a monthly basis when the lease payment is given.

When I lease the jeans to you, I will have 150 EUR (in VAT) after one year. But I have to pay the VAT today. And that creates a very negative cashflow.

- MUD Jeans

In turn, the **high rate of depreciation** of washing machines treated under accounting rules means that Bundles is reporting lowered profitability, even though its optimising of machines means that the depreciation of the appliances would occur at a much lower rate in reality. This sometimes penalises Bundles in its marketing and financing efforts.

4.6. Shifting of risks and large upfront capex may limit SME growth

Ground-level innovation in relation to servitisation and the circular economy is being driven by large companies who have the resources to pilot business models based on leasing, product performance, remanufacture, and extended lifecycle thinking, and carry the risks associated with providing services. These corporations can have wide ranging influence and effectively effect change, given their geographical reach through global supply chains. However, such efforts also rely on **SME involvement**, and in some aspects that is **proving to be a challenge**. A recent survey of nearly 300 small businesses across England, France and Belgium found almost 50 per cent had not heard of the circular economy.⁴²

In turn, performance-based and pay-per-use models means that the **risk of the customer's operation failing from**

the use of the provider's products is now being borne, either partially or in full, by the provider, and some question whether standard product warranties or professional indemnity clauses are sufficient to cover the potential liability.⁴³ As such, for SMEs with limited financial resources, this may prove to be a significant risk.

The financing of cars was a big problem for us at the beginning, especially because we were a startup company.

- Move About

The software industry is not necessarily providing the appropriate licences for burstable solutions. If we run a job using 10,000 virtual machines concurrently, we would need 10,000 licences...

So what I actually need is a 'floating virtual machine licence' that reflects this new business model.

- Rendicity

Further, because assets remain under the ownership of the provider, entrepreneurs wishing to provide access over ownership based on pay-per-use models will need to incur a **significant upfront capital expenditure**, and many find it challenging to obtain financing for such large ticket items from investors who perceive this as being too high risk. To resolve this, companies such as Move About and Bundles have found innovative financial solutions such as crowdfunding and flexible bank financing arrangements in order to purchase these assets.

Rendicity is also facing a related challenge in terms of software licensing, where the type of licences currently being offered by providers are not compatible with its burstable and "use on demand" solution. It would like to see **more resources** (both from the public and private sector) **being allocated to support such service and business model innovation**, as opposed to a singular focus on technological innovation.

5. Policy recommendations

Considering that pay-per-use works in an interplay of servitisation and the circular economy, related policy actions should support a shift towards products and services that fulfils circular economy principles, as well as rewards models providing access over ownership.

5.1. Encourage access to environmentally-friendly solutions

A co-ordinated approach by policy makers to **introduce positive legislative drivers such as waste prevention targets and eco-design incentives to promote products that can be more easily reused,**

remanufactured and disassembled would be beneficial. European Commission's circular economy framework, which introduces higher recycling targets and a landfill ban on recyclable materials across all 28 EU member states, is a good example.⁴⁴

Incentives could be also introduced to **encourage the use of products and services that have a proven and certified positive impact on the environment**. This could address some of the initial challenges relating to customer inexperience and lack of awareness relating to new and untested eco-friendly alternatives. They could include:



- Tax incentives for consumers to buy or use products which are recycled or certified as fair trade;
- Reduced VAT on eco-cars combined with lower VAT on sharing services;⁴⁵
- Subsidies for businesses which choose pay-per-use services, provided these services have been proven to fulfil circular economy principles and provide a positive environmental impact, e.g. car sharing (encourages unnecessary kilometres travelled), access to machinery and appliances (encourages optimal utilisation of resources);
- Tax credits in favour of remanufacturing firms.

Procurement rules should also be updated to encourage an **outcome-based approach to purchasing**, so that purchasers are able and encouraged to adopt pay-per-use service agreements that achieve the same or improved outcomes as the traditional procurement of capital assets.

If I can prove that my clothes are not harming the world...then I should be able to give my consumers a tax deduction for clothing.
- MUD Jeans

5.2. Update tax and regulations to reflect access-based consumption and provide an equal playing field

Policy and regulation should be continually evaluated to **ensure that emerging business models (such as pay-per-use's shift from ownership to access) are not penalised by outdated tax and regulations.**

In industries traditionally based on transference of ownership rather than leasing of assets (such as garments and washing appliances), the introduction of pay-per-use should be accompanied by similar principles as those used in other industries accustomed to leasing (as in the case of vehicle leasing). For a company like MUD Jeans, paying VAT on a monthly basis instead of upfront (the latter applicable when jeans are sold rather than leased) would ease its cash flow, which is often critical for startups.

The European Commission's Single Market Strategy is taking positive steps in this direction, by committing to develop a European agenda for the collaborative economy and new business models, including pay-per-use.

5.3. Provide funding support for early stage capital expenditures and large scale investments

Startups often face issues related to the access to capital in its initial phase of growth. This is especially a concern among companies adopting pay-per-use, which need to make large upfront capital investments and will not recoup them in a short time perspective. The products they purchase are of high quality and have long product lifespans in order to optimise utilisation, and therefore are more costly than regular options. **Dedicated financial business support schemes would help to ease this initial burden** and provide space to validate the business model. **These financial instruments should be linked to specific requirements**, such as the purchase of assets with a higher product lifespan, level of durability and potential for reuse, remanufacture.

5.4. Spread information and awareness on the total cost of ownership versus paying for use

Given that one of the biggest challenges faced by companies adopting pay-per-use is the customer awareness and acceptance of the model, particularly in relation to cost concerns, increasing information and awareness plays a key role. It can help to change ingrained patterns of behaviour and ways of thinking of companies and individuals. In particular, **a shared understanding of the economic potential and other non-financial benefits of an access-based approach to consumption is important but often lacking.**

"(When you consider the decrease in the cost for the user, the cost of repairs, the cost of stocks, and rental of shop floors, etc, then paying for use of a quality appliance will be cheaper than buying a cheap washing machine.
- Bundles

Accordingly, **better information** can help, such as labelling indicating pollution emissions associated with the use of the product or service relative to other offerings of the same category.⁴⁶



6. Appendix

6.1. Interviews

Company	Interviewee	Position
Bundles	Marcel Peters	CEO
Move About	Ulf Jakobsson	Regional director, Sweden
MUD Jeans	Bert van Son	CEO
Rendicity	Theo Lynn	CEO

6.2. Websites

Company	Web address
Bundles	https://www.bundles.nl
Move About	http://www.moveabout.net/
MUD Jeans	http://www.mudjeans.eu/
Rendicity	http://www.rendicity.com/

6.3. References

- ¹ Avlonitis, Frandsen, Hsuan & Karlsson. 2014. Driving competitiveness through servitization - A guide for practitioners. [ONLINE] Available at: <http://www.industriensfond.dk/sites/default/files/20140509.pdf>. [Accessed 19 November 15].
- ² Copenhagen Business School. 2014. Driving Competitiveness through Servitization. [ONLINE] Available at: <http://www.slideshare.net/Competitiveness/driving-competitiveness-through-servitization>. [Accessed 19 November 15].
- ³ Circular Economy Toolkit. 2004. Products as a Service. [ONLINE] Available at: <http://circulareconomytoolkit.org/products-as-a-service.html>. [Accessed 20 November 15].
- ⁴ Ashton Business School. 2013. Servitization impact study. [ONLINE] Available at: <https://connect.innovateuk.org/documents/416351/3926914/Servitization+impact+study.pdf/>. [Accessed 19 November 15].
- ⁵ HCL Technologies. 2014. Information Technology Enablers for Servitization in Manufacturing. [ONLINE] Available at: http://www.hcltech.com/sites/default/files/resources/whitepaper/files/2014/10/16/servsmart_-_whitepaper.pdf. [Accessed 20 November 15].
- ⁶ Philips. 2012. Pay-per-Lux - a whole new way to deliver light. [ONLINE] Available at: http://www.lighting.philips.com/pwc_li/main/shared/assets/downloads/casestudy-rau-int.pdf. [Accessed 19 November 15].
- ⁷ Cindy Elliott. 2014. Servitization – a New Word for a HUGE Transformative Force in Manufacturing. [ONLINE] Available at: <http://blogs.ptc.com/2014/02/12/servitization-a-new-word-for-a-huge-transformative-force-in-manufacturing/>. [Accessed 20 November 15].
- ⁸ Fast Company. 2013. 5 Business Models That Are Driving The Circular Economy. [ONLINE] Available at: <http://www.fastcoexist.com/1681904/5-business-models-that-are-driving-the-circular-economy>. [Accessed 20 November 15].
- ⁹ European Commission. 2015. Project proposes policy packages for servitisation. [ONLINE] Available at: http://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/united-kingdom/20150713-project-policy-packages-servitisation_en.htm. [Accessed 20 November 15].
- ¹⁰ The Guardian. 2015. 10 things you need to know about the circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/10-things-need-to-know-circular-economy>. [Accessed 20 November 15].



- ¹¹ Aria. 2015. Increasingly, Pay-Per-Use Is Paying Off. [ONLINE] Available at: <https://www.ariasystems.com/blog/increasingly-pay-per-use-is-paying-off/>. [Accessed 12 January 16].
- ¹² Irish Examiner. 2015. Start-up gets animated after just three months. [ONLINE] Available at: <http://www.irishexaminer.com/business/features/start-up-gets-animated-after-just-three-months-362625.html>. [Accessed 11 February 16].
- ¹³ Bundles. 2015. Corporate website. [ONLINE] Available at: <https://www.bundles.nl>. [Accessed 30 November 15].
- ¹⁴ The Guardian. 2014. Textiles manufacturers can't avoid circular economy principles forever. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/textiles-manufacturers-circular-economy-business-model>. [Accessed 20 November 15].
- ¹⁵ MUD Jeans. 2015. Corporate website. [ONLINE] Available at: <http://www.mudjeans.eu/>. [Accessed 30 November 15].
- ¹⁶ Move About. 2015. Corporate website. [ONLINE] Available at: <http://www.moveabout.se/>. [Accessed 30 November 15].
- ¹⁷ The Irish Times. 2015. Making high-performance computing available to SMEs for animation. [ONLINE] Available at: <http://www.irishtimes.com/business/making-high-performance-computing-available-to-smes-for-animation-1.2403639>. [Accessed 20 November 15].
- ¹⁸ Rendicity. 2015. Corporate website. [ONLINE] Available at: <http://www.rendicity.com/>. [Accessed 30 November 15].
- ¹⁹ PTC & Oxford Economics. 2013. Manufacturing Transformation. [ONLINE] Available at: https://www.oxfordeconomics.com/Media/Default/Thought%20Leadership/social%20digital%20media/OxfordEconomicsOverview_ebk_ENG.pdf. [Accessed 19 November 15].
- ²⁰ PTC & Oxford Economics. 2013. Manufacturing Transformation. [ONLINE] Available at: https://www.oxfordeconomics.com/Media/Default/Thought%20Leadership/social%20digital%20media/OxfordEconomicsOverview_ebk_ENG.pdf. [Accessed 19 November 15].
- ²¹ IDC. 2014. The Rise of Product-as-a-Service in Manufacturing and Some of the Technology Impacts. [ONLINE] Available at: https://idc-community.com/manufacturing/manufacturing-value-chain/the_rise_of_product_as_a_service_in_manufacturing_and_some_of_the_te. [Accessed 20 November 15].
- ²² IDC. 2014. The Rise of Product-as-a-Service in Manufacturing and Some of the Technology Impacts. [ONLINE] Available at: https://idc-community.com/manufacturing/manufacturing-value-chain/the_rise_of_product_as_a_service_in_manufacturing_and_some_of_the_te. [Accessed 20 November 15].
- ²³ Ashton Business School. 2013. Servitization impact study. [ONLINE] Available at: <https://connect.innovateuk.org/documents/416351/3926914/Servitization+impact+study.pdf>. [Accessed 19 November 15].
- ²⁴ The Guardian. 2015. The top three obstacles for policymakers in moving towards a circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/2015/sep/17/the-top-three-obstacles-for-policymakers-in-moving-towards-a-circular-economy>. [Accessed 20 November 15].
- ²⁵ The Guardian. 2015. 10 things you need to know about the circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/10-things-need-to-know-circular-economy>. [Accessed 20 November 15].
- ²⁶ World Economic Forum. 2014. Towards the circular economy: Accelerating the scale-up across global supply chains. [ONLINE] Available at: <http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/>. [Accessed 19 November 15].
- ²⁷ The Guardian. 2015. 10 things you need to know about the circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/10-things-need-to-know-circular-economy>. [Accessed 20 November 15].
- ²⁸ The Guardian. 2015. 10 things you need to know about the circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/10-things-need-to-know-circular-economy>. [Accessed 20 November 15].
- ²⁹ SPREE Project. 2015. SPREE Country Feasibility Study Report - Mobility Sector in Sweden. [ONLINE] Available at: http://www.spreeproject.com/wp-content/uploads/2013/04/Deliverable-7.1.6_Sweden-Mobility-Country-Feasibility-Report_website.pdf. [Accessed 20 November 15].
- ³⁰ SPREE Project. 2015. SPREE Country Feasibility Study Report - Mobility Sector in Sweden. [ONLINE] Available at: http://www.spreeproject.com/wp-content/uploads/2013/04/Deliverable-7.1.6_Sweden-Mobility-Country-Feasibility-Report_website.pdf. [Accessed 20 November 15].
- ³¹ The Guardian. 2014. Five key ideas on scaling up emerging circular economy principles. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/2014/nov/25/five-key-ideas-on-scaling-up-emerging-sharing-economy-principles>. [Accessed 20 November 15].



- ³² Ashton Business School. 2013. Servitization impact study. [ONLINE] Available at: <https://connect.innovateuk.org/documents/416351/3926914/Servitization+impact+study.pdf/>. [Accessed 19 November 15].
- ³³ Ashton Business School. 2013. Servitization impact study. [ONLINE] Available at: <https://connect.innovateuk.org/documents/416351/3926914/Servitization+impact+study.pdf/>. [Accessed 19 November 15].
- ³⁴ World Economic Forum. 2014. Towards the circular economy: Accelerating the scale-up across global supply chains. [ONLINE] Available at: <http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/>. [Accessed 19 November 15].
- ³⁵ Ellen MacArthur Foundation. 2015. Bundles. [ONLINE] Available at: http://www.ellenmacarthurfoundation.org/case_studies/bundles. [Accessed 20 November 15].
- ³⁶ Sultan, N., 2014. CLOUD AND MOOCS: THE SERVICITIZATION OF IT AND EDUCATION. Review of Enterprise and Management Studies, Vol. 1, No. 2.
- ³⁷ European Commission. 2015. Closing the loop: Commission adopts ambitious new Circular Economy Package to boost competitiveness, create jobs and generate sustainable growth. [ONLINE] Available at: http://europa.eu/rapid/press-release_IP-15-6203_en.htm. [Accessed 12 January 16].
- ³⁸ Love Your Clothes. 2015. WOULD YOU LEASE YOUR JEANS? INTERVIEW WITH MUD JEANS FOUNDER, BERT VAN SON. [ONLINE] Available at: <http://loveyourclothes.org.uk/would-you-lease-your-jeans-interview-with-mud-jeans-founder-bert-van-son/>. [Accessed 20 November 15].
- ³⁹ Tetra Pak. 2015. Environment an increasingly important factor in consumers' purchasing decisions. [ONLINE] Available at: <http://www.tetrapak.com/about/newsarchive/environment-an-increasingly-important-factor-in-consumers-purchasing-decisions>. [Accessed 19 November 15].
- ⁴⁰ SPREE Project. 2015. SPREE Country Feasibility Study Report - Mobility Sector in Sweden. [ONLINE] Available at: http://www.spreeproject.com/wp-content/uploads/2013/04/Deliverable-7.1.6_Sweden-Mobility-Country-Feasibility-Report_website.pdf. [Accessed 20 November 15].
- ⁴¹ The Guardian. 2014. Five key ideas on scaling up emerging circular economy principles. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/2014/nov/25/five-key-ideas-on-scaling-up-emerging-sharing-economy-principles>. [Accessed 20 November 15].
- ⁴² The Guardian. 2015. 10 things you need to know about the circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/10-things-need-to-know-circular-economy>. [Accessed 20 November 15].
- ⁴³ The Manufacturer. 2013. Servival: The servitisation of manufacturing. [ONLINE] Available at: <http://www.themanufacturer.com/articles/servival-the-servitisation-of-manufacturing/>. [Accessed 20 November 15].
- ⁴⁴ The Guardian. 2015. 10 things you need to know about the circular economy. [ONLINE] Available at: <http://www.theguardian.com/sustainable-business/10-things-need-to-know-circular-economy>. [Accessed 20 November 15].
- ⁴⁵ SPREE Project. 2015. Policy Packages. [ONLINE] Available at: <http://www.spreeproject.com/policy-packages/>. [Accessed 20 November 15].
- ⁴⁶ Ellen MacArthur Foundation. 2015. Delivering the circular economy: a toolkit for policymakers. [ONLINE] Available at: http://www.ellenmacarthurfoundation.org/assets/downloads/publications/ElleMacArthurFoundation_PolicymakerToolkit.pdf. [Accessed 19 November 15].