

Soluzioni industriali e prospettive verso l'economia circolare

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L'Osservatorio Bocconi si focalizza sulle strategie delle imprese di fronte alle sfide della Green Economy



Cominciamo quindi dalla visione di uno studioso di management:

"Pollution is a manifestation of economic waste and involves <u>unnecessary, inefficient</u> or incomplete utilization of resources. In many cases, <u>emissions are a sign of</u> <u>inefficiency</u> and force a firm to perform non-value-creating activities such as handling, storage and disposal. Efforts to <u>reduce waste and maximize profits</u> share the <u>same</u> <u>basic principles</u>, including the efficient use of inputs, substitution of less expensive materials and the minimization of unneeded activities".

Michael Porter, 1995



E' interessante notare come questa visione legata alla "efficienza" sia molto coerente con le più recenti definizioni della "economia circolare" adottate dalle istituzioni:

• «an economy that is <u>regenerative by design</u>: biological materials are designed to reenter the biosphere, and technical materials are designed to circulate with minimal loss of quality».



«an economy that is <u>restorative by intention</u>; aims to rely on renewable energy and resources;
minimize, tracks and eliminates the use of toxic chemicals; and eradicates waste through careful design».

Ellen Mac Arthur Foundation, 2014



Dobbiamo quindi attenderci che la circolarità sia una tendenza spontanea nel nostro sistema econonomico?

• No, l'abbondanza e il basso costo delle risorse naturali ci ha portato ad un modello lineare:



• Le politiche ambientali mirano invece ad un "cerchio perfetto":





Ma questo è come il sistema in realtà sta funzionando:

Si stima che nel 2020 circa 82 miliardi di tonnellate di materie prime saranno utilizzate dall'economia mondiale (il 30% in più del livello attuale)

CIO

CONSUMPTION

WASTE

Solo un terzo dei 60 metalli più comuni ha un tasso di riciclo più alto del 25%

RESIDUAL





La ricerca condotta dal nostro Osservatorio è partita con l'identificare le cause che generano le "perdite" che assottigliano il flusso (ovvero le "forze centrifughe"): Information: asymmetries





Proprio come accade nella meccanica Newtoniana, anche nei sistemi economici le forze centrifughe sono causate da <u>inerzie</u>

Dobbiamo quindi aspettarci che le inerzie sui mercati, nello sviluppo tecnologico, nelle infrastrutture... rendano sempre difficile o siano perfino in grado di impedire la circolarità?

No, la nostra ricerca ha identificato alcuni "fattori interni" alle aziende che possono in alcuni casi superare le inerzie e fungere da forze centripete a favore della circolarità (chiudendo i cicli), ad esempio :

- Rischi da scarsità di risorse o volatilità incremento dei loro prezzi
- Nuove opportunità di mercato legate allo sviluppo di prodotti e servizi verdi
- Sinergie e risparmi derivanti dalla cooperazione (anche a livello territoriale)
- Etc.



Questi fattori hanno giocato un ruolo cruciale nel promuovere la circolarità in molte best practice aziendali. Ne abbiamo mappate molte, fuori e dentro l'Osservatorio



RAW MATERIALS



Mapei: **RE-CON**ZErØ project

- Every year, worldwide, 10 billions of cubic meters of concrete are produced
- The main waste is "**returned concrete**", i.e. wet cement not used that turns back to production plant and goes to landfill. It is worth 5% of USA total production, 2% of total production in Japan and Europe.
- RE-CONzero project uses an additive to transform returned concrete in a new granular raw material, which is entirely used as aggregate for concrete production, saving up to 265 Kg of CO2 per m3 of returned concrete.



DESIGN



Grlsberg Circular Community

- Based on EC Product Environmental Footprint study, lighter packaging with a lower environmental impact (e.g.: not using CO2) are preferred. In Italy this has yield a reduction in CO2 emissions by 28% per beer hectoliter.
- A Cradle to Cradle approach is adopted to improve «circularity», e.g.: by improving purity of packaging to favor recyclability.







PRODUCTION

- Renault's remanufacturing plant in Choisy-le-Roi
 near Paris, France, employing 325 people,
 reengineers different mechanical subassemblies,
 from water pumps to engines.
- The company also **redesigns components** (such as gearboxes) to increase the reuse ratio and make sorting easier by standardizing components. While more labor is required for remanufacturing than making new parts, there is still a net profit because no capital expenses are required for machinery, and no cutting and machining of the products, resulting in **no waste and a better materials yield**.
- Renault has achieved reductions of 80% for energy, 88% for water and 77% for waste from remanufacturing rather than making new components.







DISTRIBUTION

- **PHILIPS** Lighting as a service.
- Philips has a track record in the collection and recycling of lamps. For example, in the EU,
 Philips has a stake in 22 collection and service organizations that collect 40% of all mercury-containing lamps put on the market and with a recycling rate greater than 95%.
- Philips achieves these results also thanks to a new way of selling lighting as a service, not as a product. In this way, Philip can reach more customers (if they retain ownership of the lighting equipment) as customers don't have to pay high upfront costs and Philips ensures the sound environmental management of end-of-life lighting equipment. It's a new way for customers to achieve their sustainability goals: high lighting performance, high energy efficiency, and a low materials footprint.



CONSUMPTION



Repair Café

Begun in the Netherlands in 2007 and now in more than a dozen countries with approximately 400 shops, Repair Café is a nonprofit organization that brings together handy volunteers and people who would like to fix rather than replace their small appliances and other items. The service is free and is sponsored by local and larger businesses.



 During an eight-week promotion, Sweden's IKEA turned its Facebook page into a digital flea market where people could buy and sell used IKEA furniture every Sunday. The campaign was intended to inspire customers to live more sustainably by selling their old furnishings rather than throwing them out.







COLLECTION

- Starting in early 2013, H&M launched a global **instore clothing collection program** to encourage customers to bring in end-of-use clothes in exchange for a voucher.
- To manage downstream processing of the clothes H&M collects, they collaborate with I:CO, an apparel reverse logistics service provider, which handles the manual sorting for re-wear, reuse, recycling or energy generation.
- Of the total clothing collected:

· HAM

- 40 to 60%: selected for marketing as re-wear second-hand clothes that are sold worldwide;
- 5 to 10%: reuse: these are textiles no longer suitable for wear, which are cascaded into other products, including cleaning cloths;
- 30 to 40%: textiles that can't be reused and get a new chance as textile fibres or are used to manufacture products such as damping and insulating materials in the auto industry.
- When these three options have been exhausted, textiles are used to produce energy.





RECYCLING

- Piaggio 🚳
 - A co-operative project between Revet, a company that operates for the Italian consortium for plastic recovery (Corepla), a research center (Pontech) and a user-company (Piaggio)
 - 15,000 tons of lower quality and heterogeneous collected plastic waste (plastic film, parts of toys, detergent bottles, etc.), traditionally considered non-recyclable, to produce an innovative plastic mix.





Quali lezioni possiamo trarre?

- Le aziende sviluppano soluzioni "circolari" quando hanno forti incentivi a farlo al proprio interno.
- Nel modello economico attuale, gli "auto-incentivi" sono frenati da inerzie di diverso tipo: regolamentazioni, limiti tecnologici, barriere di mercato, ecc.
- Servono incentivi esterni: il ruolo delle politiche è cruciale per superare le inerzie e sbloccare le potenzialità dell'economia circolare.

Tornando al punto di pertenza, ovvero la teoria di Porter, confermata da molti studi successivi: «Well designed and properly crafted environmental policies and regulations are able to trigger innovation, they produce efficiency through waste avoidance or recovery and, by doing so, they boost competitiveness that partially or more than fully offsets the cost of compliance»





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Il supporto all'economia circolare dovrebbe essere efficace a livello sistemico





Da quali variabili dipende il conferito al riciclo della plastica?

(Fonte: studio Sant'Anna per Corepla)



		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
I	(Constant)	-351216,091	99683,315		-3,523	,012
	Separated waste collection	7424,642	1035,638	1,155	7,169	,000
	Containers for liquids	2805,039	902,829	,449	3,107	,021
	Manufacture industries of plastic containers	172,897	58,956	,267	2,933	,026



E quello della carta? (Fonte: studio Sant'Anna per Comieco)





Il caso portoghese



Portuguese Environment Agency

Figure 2 - Scheme of the Portuguese recycling sector (household flow)



Efficiente grazie al finanziamento

€/ton recycled





Costi e benefici nel caso svedese

The following graph shows the elements and final result of the cost-benefit balance of domestic plastic packaging recycling in Sweden in 2006 [Denkstatt/IVL 2007]. The figures show that the recycling benefits cannot outweigh the additional costs, if *all* domestic plastic packaging is collected. A different scenario investigated how the results would change if only rigid domestic plastic packaging is collected: In that case the CBA result was positive!





In Austria il bilancio è positivo per il «commercial waste»



Figure 16: Results of cost-benefit analyses for recycling of domestic and commercial plastic packaging in Austria show the improvements after 10 years of optimisation, in comparison to a reference scenario without any separate collection (all plastic packaging is treated together with residual waste).



Molti studi dimostrano la profittabilità anche a livello sistemico



Fonte:

Performance Evaluation of the Proposed and Existing Waste Management System: Economic Analysis

> Swapan Das* and Bidyut Kr. Bhattacharyya Department of Mechanical Engineering Indian Institute of Engineering Science and Technology. Shibmur



Grazie per l'attenzione

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