Krožno gospodarstvo

Priložnosti krožnega gospodarstva

(nove tehnologije in poslovni modeli)

Delavnica »Konkurenčne prednosti, ki jih podjetjem v gradbenem sektorju, omogoča prehod v krožni gospodarski model«

Ljubljana, 04. 02. 2019

Andro Goblon

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5 vzorcev krožnih poslovnih modelov in 3 vrste disruptivnih tehnologij

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- Definicija poslovnega modela.
- Predstavitev 5 vzorcev krožnih poslovnih modelov
- Definicija disruptivne tehnologije
- Predstavitev 3 vrst disruptivnih tehnologij

Krožno gospodarstvo je nov pogled na odnose med trgom, kupci in naravnimi viri.

Linearni gospodarski model temelji na predpostavki, da so viri neomejeni, zlahka dobavljivi in dostopni ter da je njihovo pridobivanje poceni.

5 vzorcev krožnih poslovnih modelov

- „Krožna“ nabava
- Vračilo virov v predelavo ali ponovno uporabo
- Povečanje življenjske dobe produktov
- Platforme, ki omogočajo delitev in skupno rabo
- „Izdelek kot storitev“ poslovni model

5 vzorcev krožnih poslovnih modelov

„Krožna“ nabava

- Raba energije iz obnovljivih virov.
- Raba biomaterialov ali materialov, ki so v celoti reciklirani.

Bio etanol iz „odpadne“ celuloze (stebla in listi koruze, storži, lupine,…)

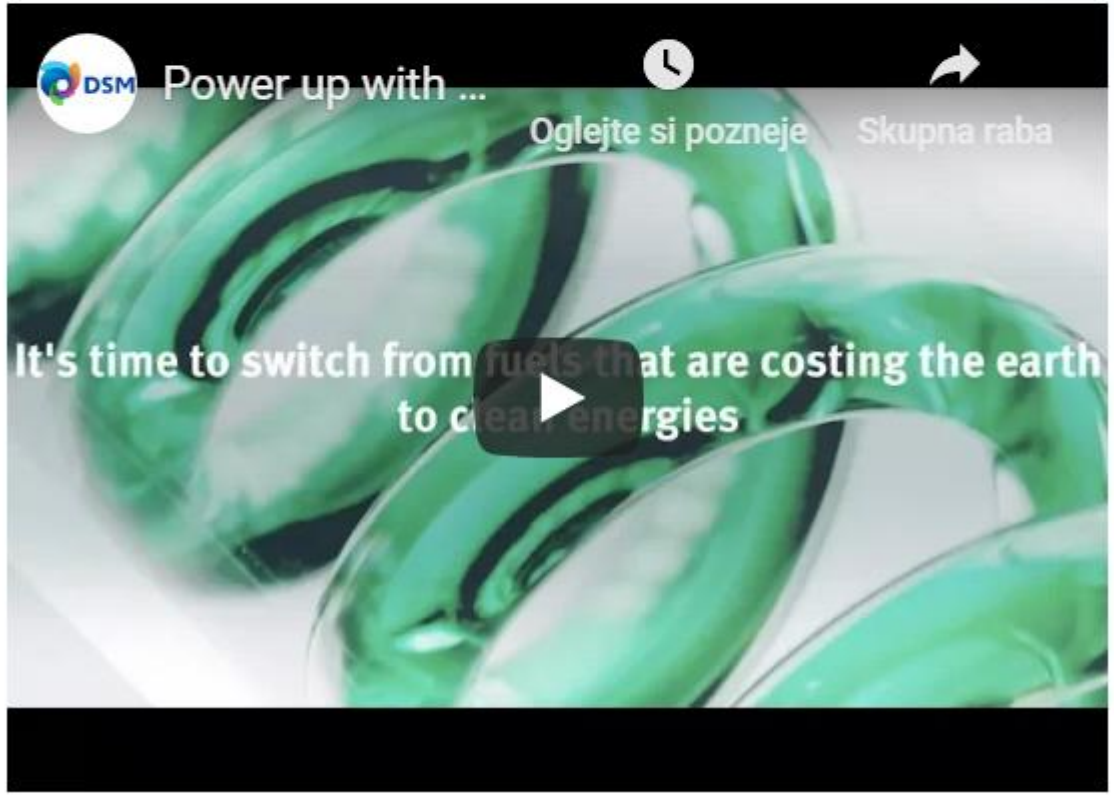
https://www.dsm.com/corporate/about/business-entities/dsm-biobased-productsandservices.html

DSM Bio-based Products & Services | POET-DSM | Reverdia

DSM Bio-based Products & Services

Share

Drawing on DSM's unique position in biotechnology, materials sciences and chemistry, DSM Bio-based Products & Services is pioneering advances in renewable energies such as cellulosic bio-ethanol and in renewable building blocks like bio-based succinic acid.



5 vzorcev krožnih poslovnih modelov

Vračilo virov v predelavo ali ponovno uporabo

- Pridobitev uporabnih virov iz odpadnih materialov, stranskih proizvodov ali odpadkov.

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- Walt Disney World Resort sends food waste — including grease, cooking oils and table scraps — from select restaurants in its complex to a nearby 5.4 MW anaerobic digestion facility owned and operated by Harvest Power. The organic waste is converted into renewable biogas (a combination of carbon dioxide and methane) to generate electricity, with the remaining solid material processed into fertilizer. The energy generated helps to power Central Florida, including Walt Disney Resort's hotels and theme parks.

5 vzorcev krožnih poslovnih modelov

Povečanje življenjske dobe produktov

- To lahko naredimo s popravilom, nadgradnjo in preprodajo (ponovno uporabo) ter pred tem z inovacijami in oblikovanjem izdelka

SUSTAINABILITY

CIRCULAR ECONOMY

Wherever possible, we keep resources in the Caterpillar value chain through a circular flow of materials, energy and water. Our focus on developing better systems optimizes our use of resources, maximizes the total life cycle value of our products and minimizes the cost of ownership for our customers. Viewing our equipment through a total life cycle lens allows us to make sustainable progress for communities, the environment and the economy.

Caterpillar strives to provide customers with quality equipment that provides the best economic proposition for their business. Our remanufacturing (reman) and rebuild businesses provide customers not only with an immediate cost savings, but also help extend life cycles and use materials more efficiently.

REMANUFACTURED PRODUCTS AND REBUILT PRODUCTS

The Caterpillar Sustainable Solutions, Solar Turbines and Progress Rail Services remanufacturing programs provide customers with lower-cost products, shorter downtime and quick, dependable service options.

Rebuild programs increase the lifespan of equipment by providing customers with product updates for a fraction of the cost of buying a new machine. Rebuild programs include Cat® Certified Rebuilds, component overhauls at Cat® dealers, Solar Turbines rebuilds and Progress Rail Services rebuilds. A complete Cat Certified Rebuild includes more than 350 tests and inspections, automatic replacement of approximately 7,000 parts and a like-new machine warranty. In addition, trained dealer service professionals perform this work using genuine equipment and parts. Caterpillar provides information, data, training and service tools to help dealers make the most appropriate decisions on which parts to reuse in order to achieve expected longevity of rebuilt components. Reuse of components helps us use materials and energy more efficiently.

The remanufacturing and rebuild programs allow customers to maximize the built-in value of their equipment by:

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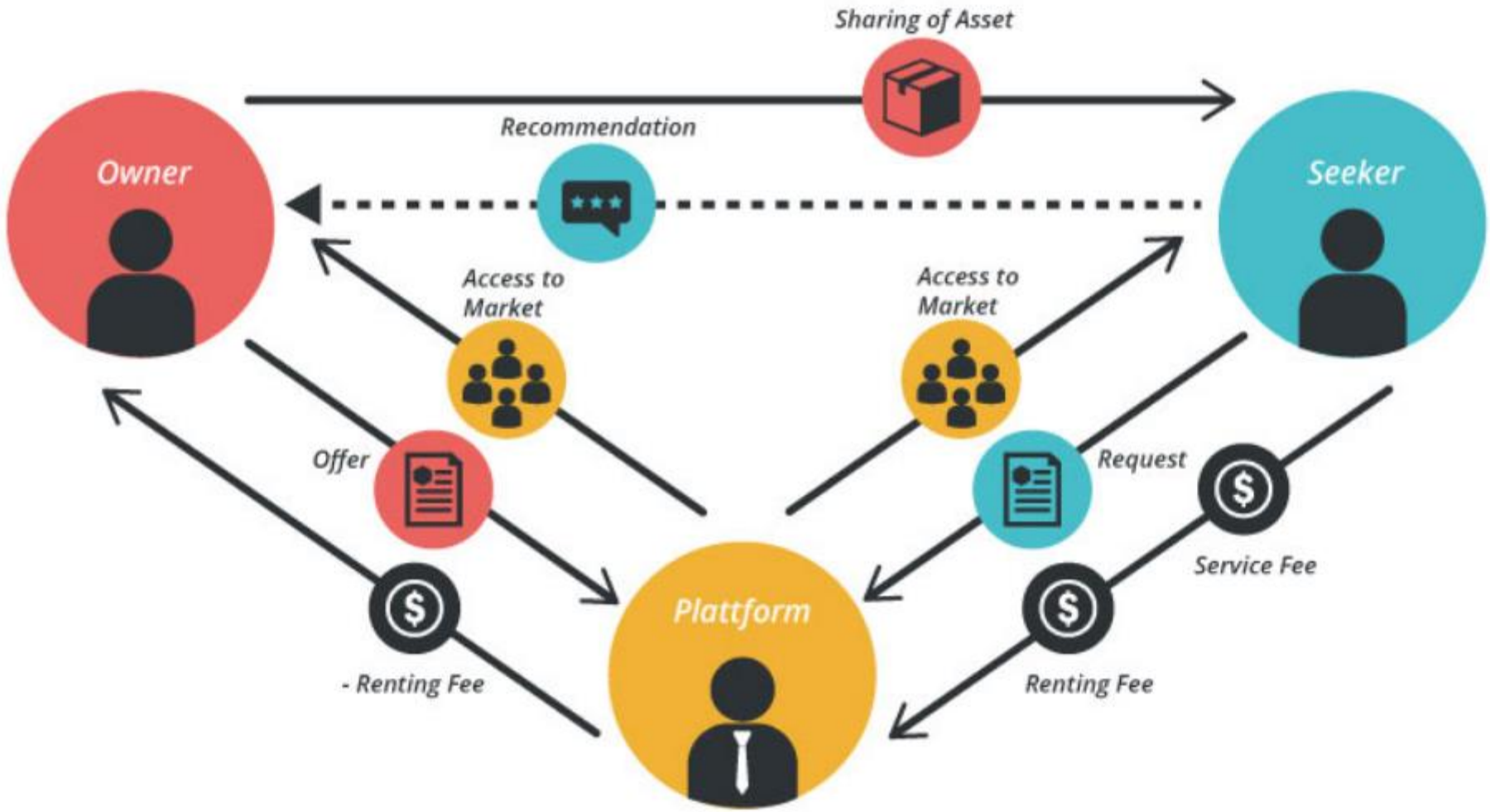
5 vzorcev krožnih poslovnih modelov

Platforme, ki omogočajo delitev in skupno rabo

- Povezava uporabnikov med seboj in spodbujanje skupne rabe, dostopa ali lastništva, da povečamo uporabo izdelkov

Sharing Economy



5 vzorcev krožnih poslovnih modelov

Izdelek kot storitev“ poslovni model

- Namesto prodaje strankam ponudimo plačljiv dostop do izdelkov.

Philips provides Light as a Service to Schiphol Airport

April 16, 2015

Philips introduces light as a service at Schiphol supporting the transition to a circular economy

Amsterdam, the Netherlands - Schiphol Group, Cofely and Royal Philips (NYSE: PHG AEX: PHIA), the global leader in lighting, have entered into a collaboration for the new lighting in the terminal buildings at Amsterdam Airport Schiphol. The light as a service means that, Schiphol pays for the light it uses, while Philips remains the owner of all fixtures and installations. Philips and Cofely will be jointly responsible for the performance and durability of the system and ultimately its re-use and recycling at end of life. By using energy-efficient LED lamps, a 50% reduction in electricity consumption will be achieved over conventional lighting systems.

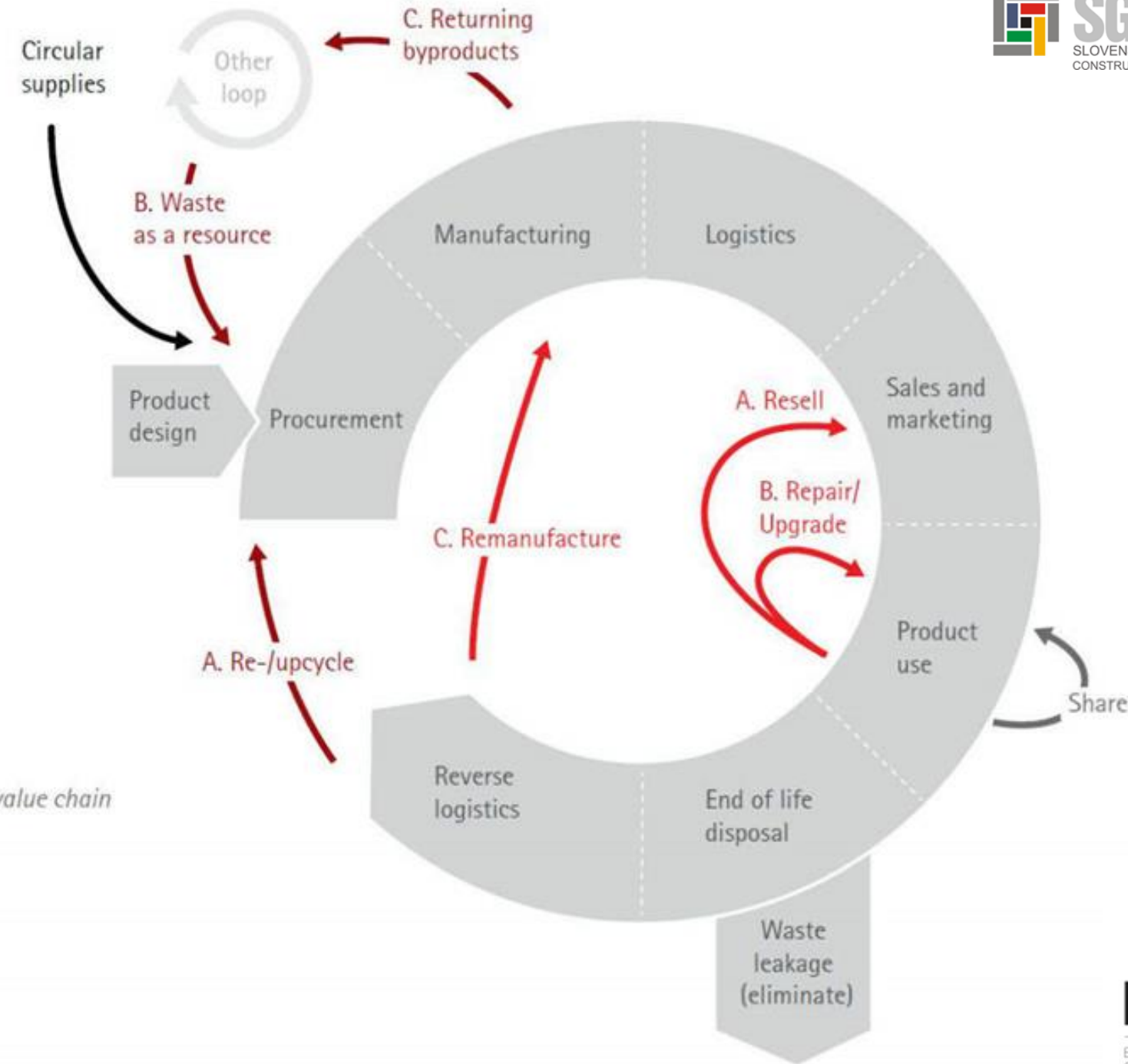
In association with architects Kossmann.dejong and Philips Design, lighting fixtures were specially developed for Amsterdam Airport Schiphol that will last 75% longer than other conventional fixtures as the design of the fixtures improved the serviceability and therefore improved the lifetime. In addition, the fixture components can be individually replaced. This will reduce maintenance costs and means that the entire fixture does not have to be recycled, resulting in the greatest possible reduction in raw material consumption.


NO STEP
Shell

Business Models

- **Circular Supplies:** Provide renewable energy, bio based- or fully recyclable input material to replace single-lifecycle inputs
- **Resource Recovery:** Recover useful resources/energy out of disposed products or by-products
- **Product Life Extension:** Extend working lifecycle of products and components by repairing, upgrading and reselling
- **Sharing Platforms:** Enable increased utilization rate of products by making possible shared use/access/ownership
- **Product as a Service*:** Offer product access and retain ownership to internalise benefits of circular resource productivity

** Can be applied to product flows in any part of the value chain*



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Izziv:

- Kaj je „poslovni model“?
- Ali vsi v podjetju poznajo in enako razumejo poslovni model?
- Kdaj je bil zadnjič spremenjen?

3 vrste disruptivnih tehnologij

- Digitalne tehnologije
- Fizične tehnologije
- BIO tehnologije

Digitalne tehnologije

- Internet stvari (IoT),
- „big data“,
- podatkovne verige (blockchain) ,
- Radiofrekvenčna identifikacija (RFID),
- BIM

Organizacijam pomagajo (na primer) pri načrtovanju, sledenju virov, spremljanju izkoriščenosti in zmogljivosti tudi za ravnanje z odpadki).

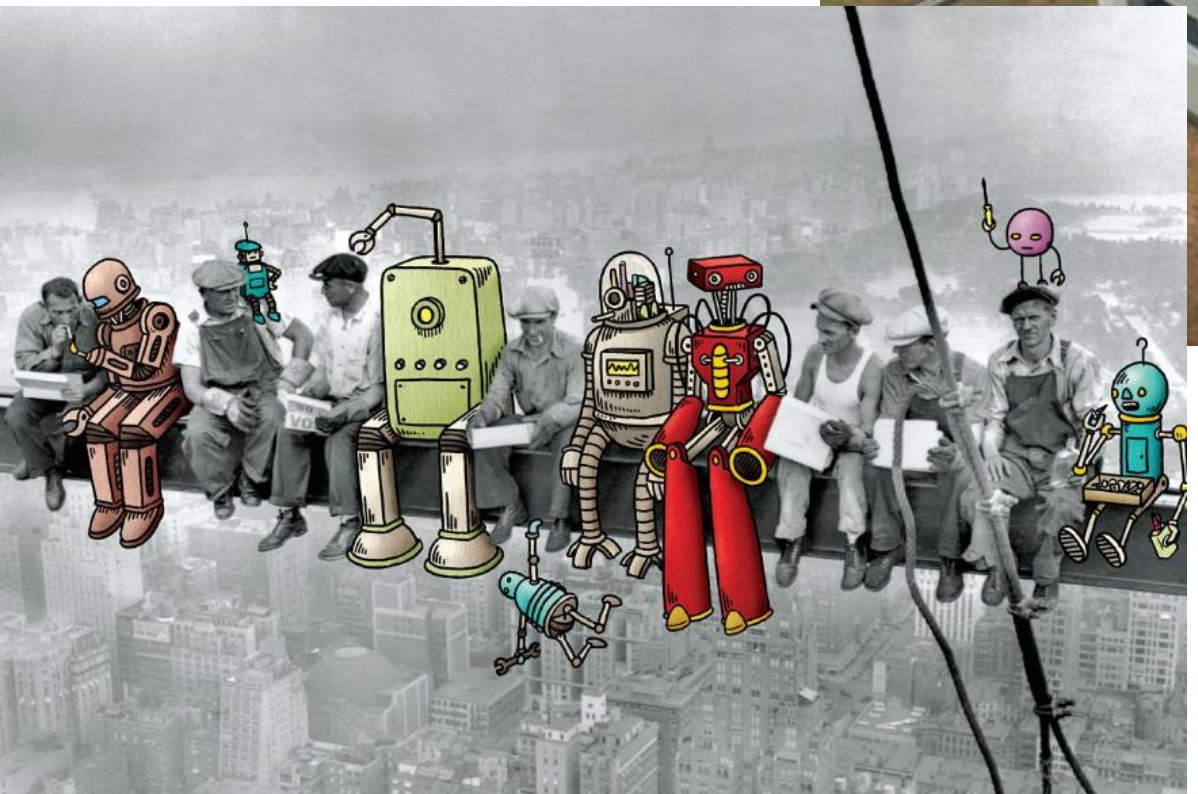
Fizične tehnologije

- 3D tiskanje,
- robotika,
- shranjevanje energije,
- modularne tehnologije,
- nanotehnologija

Organizacijam pomagajo zmanjševati stroške materiala in produkcije ter zmanjševati okoljske vplive.

Nanotehnologija pomaga ohranjati kultur
https://www.delo.si/novice/.../nanotehnologija-pomag
Z izsledki **nanotehnologije** na tem **področju** se ukvarja
Slovenije, ZVKDS – Zavod za varstvo kulturne dediščine

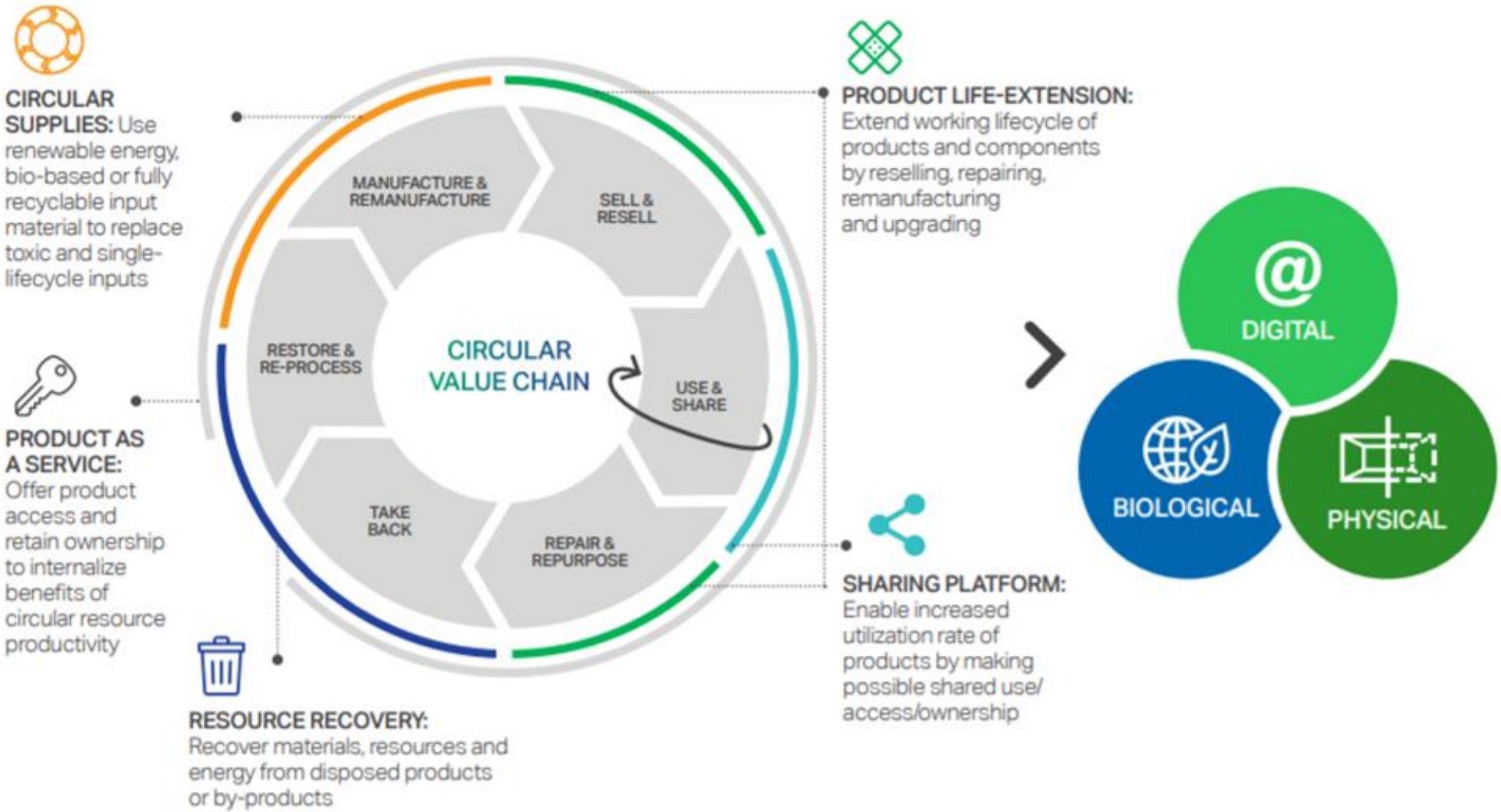
Novi gradbeni materiali: od betona do na
https://izvozniki.finance.si/8818007
V Ciudadu de Mexicu je fasada z nanodelci iz titanovega
z enakim premazom skorajda ni mogoče prodati. avtor.



BIO tehnologije

- bio-energija,
- bio-materijali,
- Bio-kompozitni materiali
- biokataliza,
- hidroponika,
- akvaponika,
- aeroponika
- bionika, biomimetika (kot principa)

Figure 5:
Five business models and three disruptive technologies



Poslovni modeli, ključne tehnologije in dodatno:

2 principa:

- **Bionika ali biomimetika**,
- **Biofilično oblikovanje** (biophilic design)

Bionika (ali biomimetika)

Delovanje in razvoj Wikipedije omogočajo vaši prispevki! [skrij]

Bionika

Iz Wikipedije, proste enciklopedije

Biónika je biološka veda, ki preučuje funkcije živih bitij in s tem rešuje tehniške probleme.

Besedo »bionika« (izvirno angleško *bionics*) je leta 1958 skoval ameriški zdravnik in častnik Jack E. Steele, verjetno iz starogrške βίον: bion, kar pomeni *enota življenja*, in pripone -ic, kar pomeni *kot* ali *na način*, *tako*, ter zaradi tega *kot življenje*. Nekateri slovarji razlagajo izvor besede tudi iz **bio**logija + elektro**nika**.

Ločimo:

- *biološko* bioniko, ki se ukvarja s procesi, nastajajočih v bioloških sistemih,
- *teoretično* bioniko, ki razdeluje matematične modele teh procesov in
- *tehniško* bioniko, ki uporablja modele teoretične bionike za reševanje inženirskih nalog.

Bionika je tesno povezana z biologijo, fiziko, kemijo, kibernetiko in tehniškimi znanostmi in vedami: elektroniko, navigacijo ipd.

Julian Vincent, profesor biomimetike na Univerzi v Bathu, ocenjuje da se pri rabi mehanizmov trenutno prekriva le 10 % biologije in tehnologije.

Znani primeri bionske tehnologije [uredi | uredi kodo]

- **Ježek** je verjetno naj bolj znan primer biomimetike. Leta 1948 je inženir George de Mestral po sprehodu čistil dlako svojega psa. Opazil je seme trave, ki se je močno oprijelo dlake. Preučil je mehanizem kako se seme oprijema. To znanje je izkoristil za je zapiranje čevljev in oblačil.
- **Žagini zobje** so v 19. stoletju dobili **obliko roga**. To se je zgodilo po opazovanju okončin lesnih zajedalcev in povzročilo med takratnimi gozdarji mini revolucijo, ker je pospešilo podiranje dreves.
- Odbojniki svetlobe, ki delujejo po vzoru **mačjih oči**. Leta 1935 jih je odkril Percy Shaw med preučevanjem mačk.
- Leonardo da Vinci je bil eden od pionirjev bionike na področju izdelave **letalnih naprav**. Tudi on se zgledoval po živalskem svetu (v večini po živalih, ki znajo leteti).
- **Lokvanjev list** ima sposobnost samočiščenja. Voda in umazanija se ga ne oprimeta.
- Tudi **tekoči kristali** so bili sprva opaženi v naravi, danes pa se nahajajo v večini zaslonov.
- Umetne **nevronske mreže** so narejene po vzoru bioloških možganov. Za razliko od računalnika se učijo same, so odporne na okvare in delujejo popolnoma paralelno.

Biofilično oblikovanje

Biofilično oblikovanje - narava v arhitekturi

Skupina ekologov, arhitektov, psihologov, znanstvenikov, raziskovalcev in urbanistov se tako že od leta 2006 ukvarja z vprašanjem, kako bi bilo mogoče sodobno družbo in življenje v njej ponovno približati naravi.

Odgovor so našli v tako imenovanem „biofiličnem oblikovanju“ (biophilic design)- arhitekturnem, urbanističnem in oblikovalskem principu, ki si prizadeva za vključevanje narave v stavbe, naselja in druga „umetna“ okolja.

Biofilično oblikovanje spodbuja uporabo naravnih materialov, kot so les, kamen, voda in rastline, poleg tega pa poudarja pomen uporabe različnih tekstur in vzorcev, ki prostorom in površinam vdahnejo občutek globine in večplastnosti, ki ju poznamo iz narave.

Biofilično oblikovanje je tako v marsičem podobno tisočletja starim praksam iz Indije in Kitajske, ki z uravnotežanje naravnih elementov in upoštevanjem naravnih ciklov in pojavov spodbujajo harmonično, človeku in naravi prijazno gradnjo in oblikovanje.

http://www.dominvrt.si/clanek/dobro-je-vedeti/veste-kaj-je-to-biofilija.html

14 PATTERNS OF BIOPHILIC DESIGN

Improving Health and Well-Being in the Built Environment

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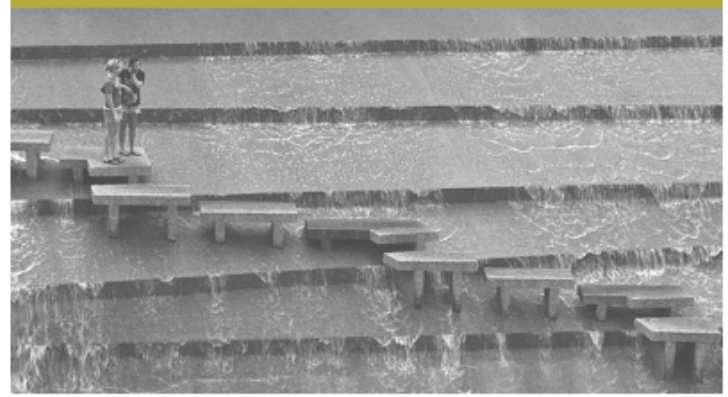
NATURE IN THE SPACE

1. **Visual Connection with Nature**
   A view to elements of nature, living systems and natural processes.
2. **Non-Visual Connection with Nature**
   Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes.
3. **Non-Rhythmic Sensory Stimuli**
   Stochastic and ephemeral connections with nature that may be analyzed statistically but may not be predicted precisely.
4. **Thermal & Airflow Variability**
   Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.
5. **Presence of Water**
   A condition that enhances the experience of a place through the seeing, hearing or touching of water.
6. **Dynamic & Diffuse Light**
   Leveraging varying intensities of light and shadow that change over time to create conditions that occur in nature.
7. **Connection with Natural Systems**
   Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.

NATURAL ANALOGUES

8. **Biomorphic Forms & Patterns**
   Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.
9. **Material Connection with Nature**
   Material and elements from nature that, through minimal processing, reflect the local ecology or geology to create a distinct sense of place.
10. **Complexity & Order**
    Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature.

NATURE OF THE SPACE



11. **Prospect**
    An unimpeded view over a distance for surveillance and planning.
12. **Refuge**
    A place for withdrawal, from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead.
13. **Mystery**
    The promise of more information achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment.
14. **Risk/Peril**
    An identifiable threat coupled with a reliable safeguard.

https://www.terrapinbrightgreen.com/reports/14-patterns/

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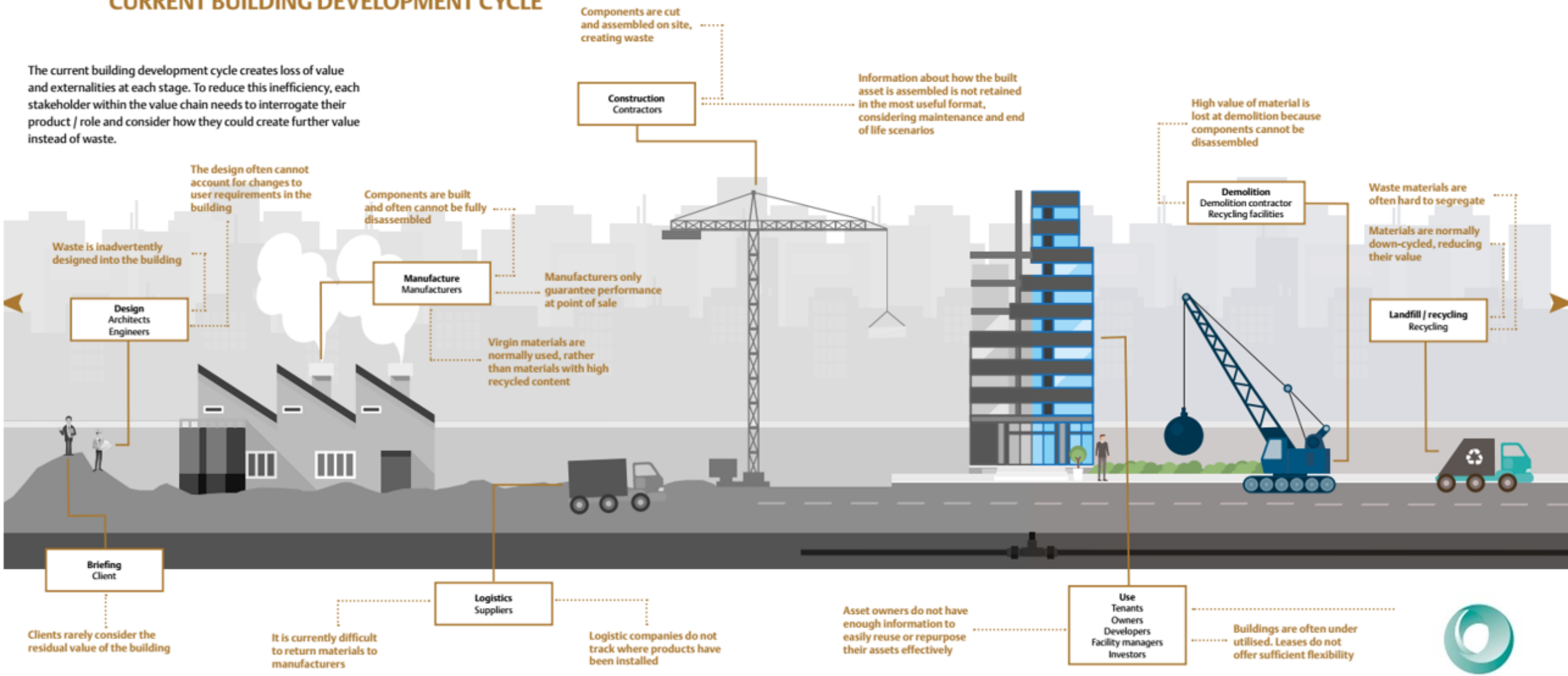
CURRENT BUILDING DEVELOPMENT CYCLE

The current building development cycle creates loss of value and externalities at each stage. To reduce this inefficiency, each stakeholder within the value chain needs to interrogate their product / role and consider how they could create further value instead of waste.



Vir: Circular Business Models in Build Evironment, ARUP, BAM, CE100, **ELLEN MACARTHUR FOUNDATION**

CIRCULAR BUSINESS MODELS IN THE CURRENT VALUE CHAIN

CIRCULAR DESIGN CIRCULAR USE CIRCULAR RECOVERY

This diagram demonstrates that there are multiple circular business models (CBMs) which can be grouped into three categories: design, use and recovery - these relate to the stage of the building lifecycle when they will be engaged.

TRACKING FACILITY

This model aims to provide services to facilitate the tracking of materials, components and parts of a system so that they can be marketed and traded in secondary raw materials markets.

SUPPORT LIFECYCLE

Consumables, spare parts and add-ons to support the lifecycle of long-lasting products.

SELL AND BUY-BACK

In this case, a product is sold on the basis that it will be purchased back after a period of time.

LIFETIME EXTENSION

In this case, the aim is to extend the service life of products, components and systems through engineering solutions including easy disassembly and reassembly, repair, maintenance and/or upgrade.

PRODUCT AS A SERVICE

This CBM aims at delivering performance rather than products and the ownership of the product is retained by the service provider. The primary revenue stream comes from payment for performance delivered. This applies most obviously to mechanical plant, lighting, and fit out, but can potentially be extended to all parts of a building and infrastructure.

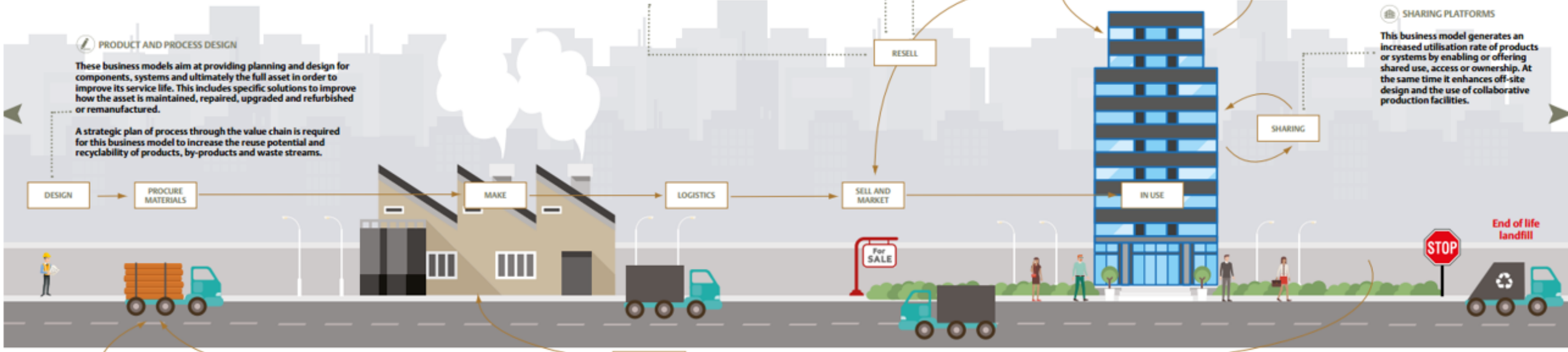
SHARING PLATFORMS

This business model generates an increased utilisation rate of products or systems by enabling or offering shared use, access or ownership. At the same time it enhances off-site design and the use of collaborative production facilities.

PRODUCT AND PROCESS DESIGN

These business models aim at providing planning and design for components, systems and ultimately the full asset in order to improve its service life. This includes specific solutions to improve how the asset is maintained, repaired, upgraded and refurbished or remanufactured.

A strategic plan of process through the value chain is required for this business model to increase the reuse potential and recyclability of products, by-products and waste streams.



CIRCULAR SUPPLIES

These business models focus on the development of new materials to enhance renewable energy, bio-based, less resource-intensive or fully recyclable materials.

RECAPTURE MATERIAL SUPPLIERS

Recaptured materials, components and parts of a system are sold to be used instead of virgin or recycled materials. For example cement replacement in concrete.

RECYCLING FACILITY

This model focuses on transforming waste into raw materials. Additionally, revenue can be created through pioneering work in recycling technologies.

REFURBISH AND MAINTAIN

Used parts and components are refurbished and maintained so that they can be sold.

RECOVERY PROVIDER

Provides take-back systems and collection services to recover useful resources from disposed products or by-products.

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S katerimi partnerji sodelovati za uresničitev prehoda v krožno gospodarstvo?

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