Use Intensification vs. Sufficiency: The Role of Interface Design

BEREC – Digital sufficiency

Limites Numériques



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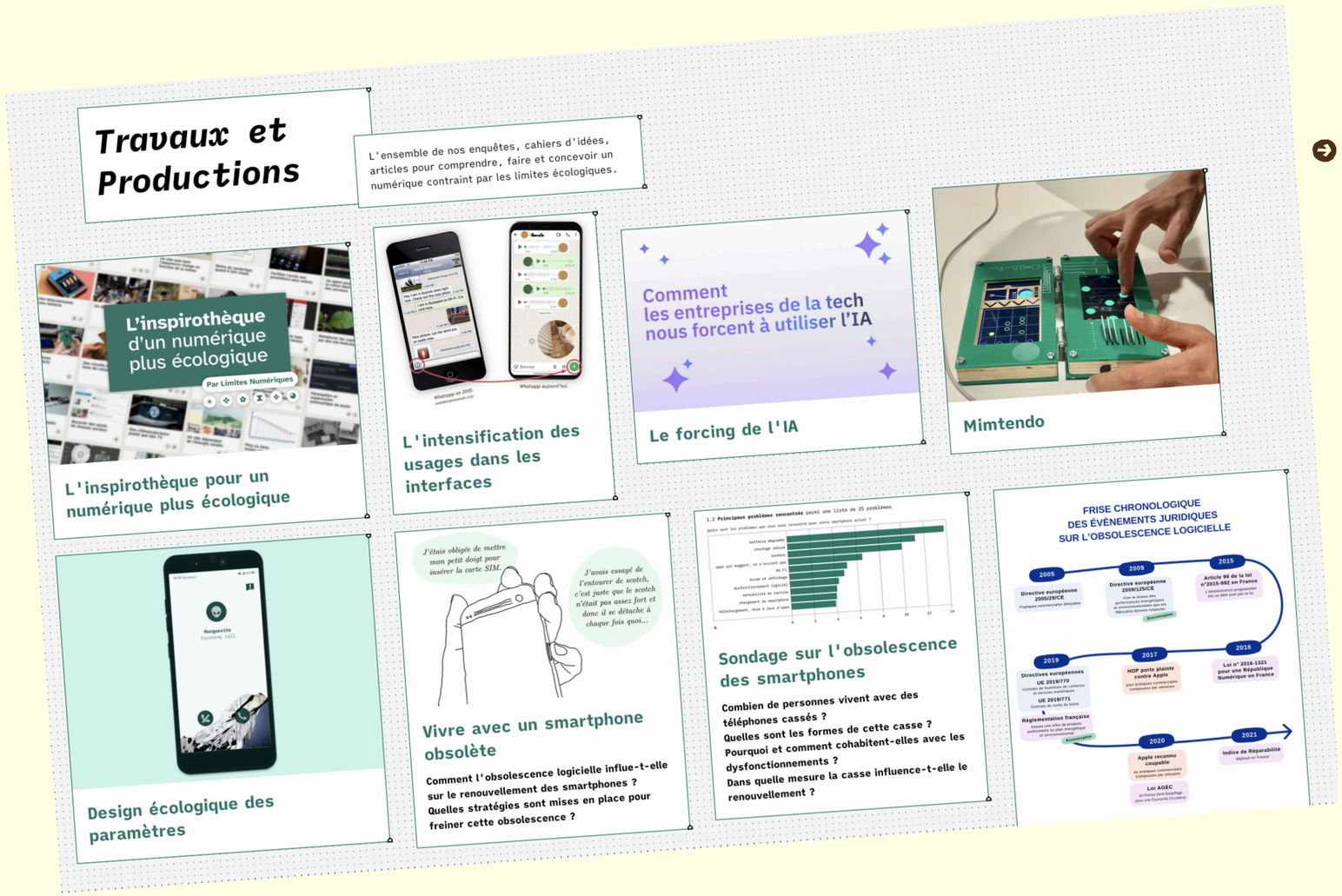
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FRANCE 2030 PROGRAMME DE RECHERCHE COLLABORATION NUMÉRIQUE

Limites numériques



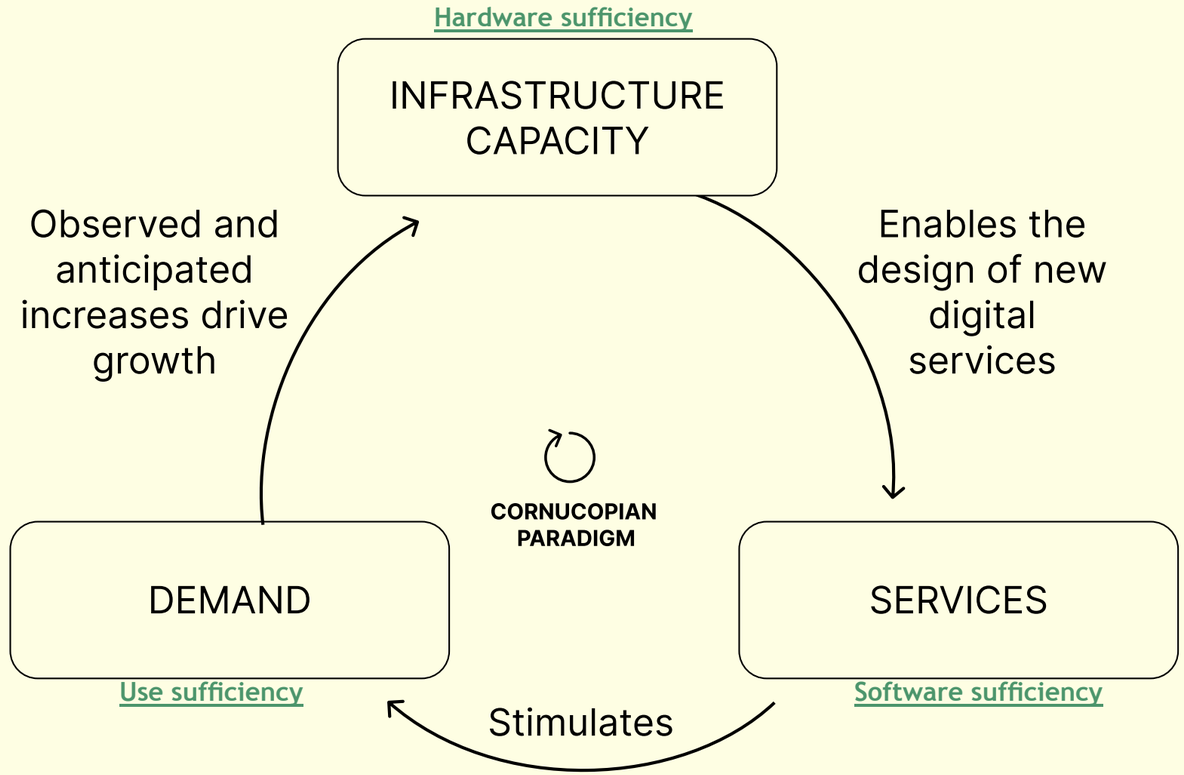
- Understanding what drives unsustainable digital practices

The cornucopian paradigm

Understanding the expansion of digital services

The growth of the digital infrastructure is correlated with a growth in demand and driven by values and principles embedded in the digital design of services.

e.g. Abundance, individuality, convenience, choice, instantaneity,…



CORNUCOPIAN PARADIGM (Preist et. al, 2016)

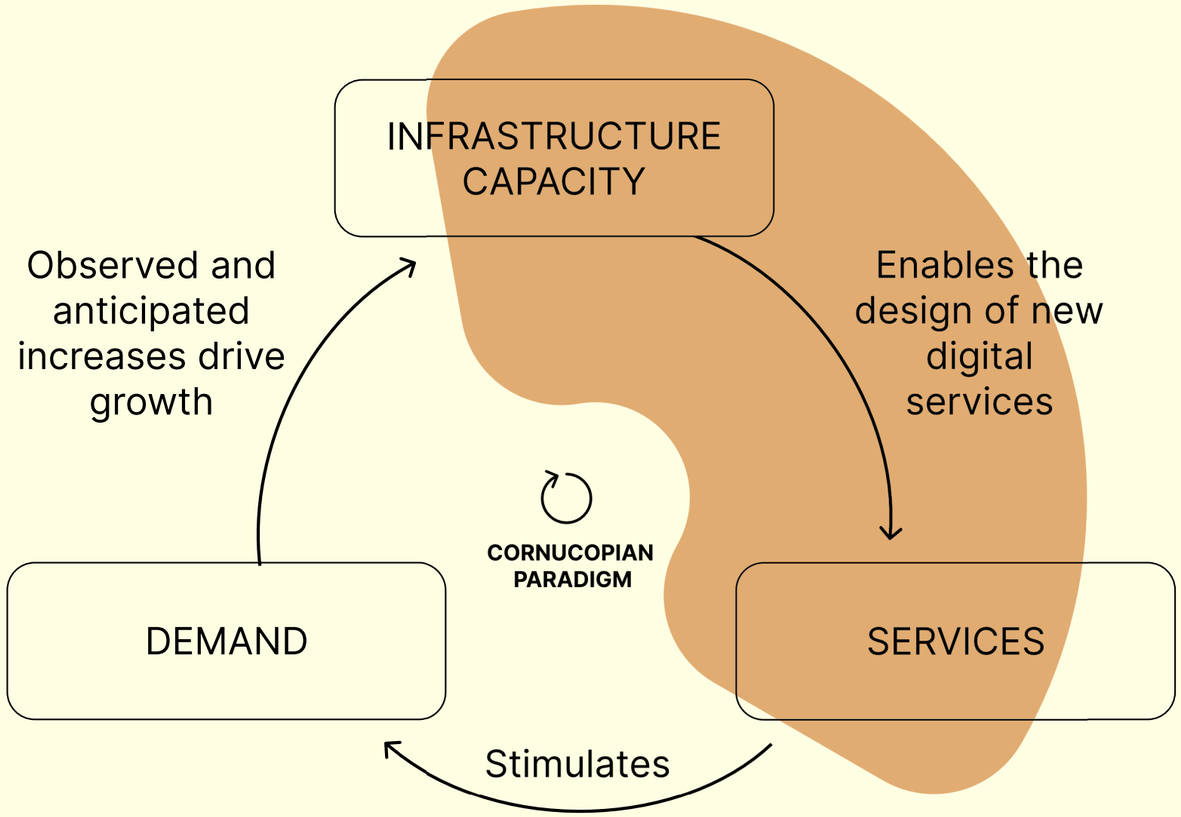
Preist, Schein & Blevis, [2016], Understanding and Mitigating the Effets of Device and Cloud Service Design Decisions on the Environnemental Footprint of Digital Infrastructure

The cornucopian paradigm

Efficiency is not enough

- Infrastructure optimization
- Software efficiency
- Eco-design

ICT footprint keeps growing

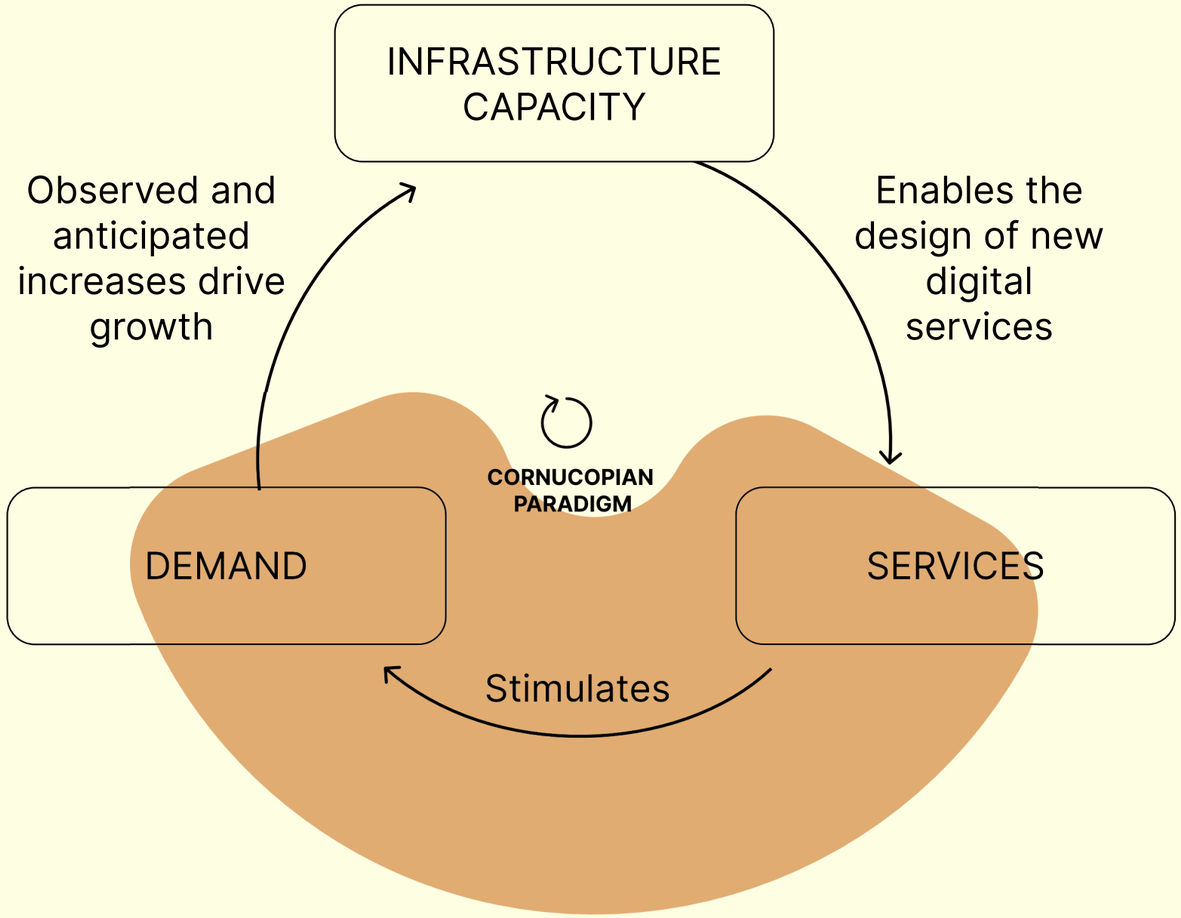


The cornucopian paradigm

Lack of consideration of rebound and indirect effects

- Increasing demand for infrastructural capacity *(data transfer, storage, computation, personal device renewal)*

- Interface design orients uses, how is it reinforcing the cornucopian paradigm



How do interface design choices go against digital sufficiency?

Beignon, A., Tabard, A., & Maudet, N. (2026, April). How Interface Design Choices Lead to Indirect Environmental Impacts Through Use Intensification. In Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems (pp. 1-18).

Beignon, A., Thibault, T., Maudet, N.,. Imposing AI: Deceptive design patterns against sustainability. LIMITS '25, 11th Workshop on Computing Within Limits, Jun 2025, Online. ⟨hal-05236944⟩

Thibault, T., Mosesso, L., Adam, C., Tabard, A., Beignon, A., & Maudet, N. (2025). Environmental (in) considerations in the Design of Smartphone Settings. LIMITS '25, 11th Workshop on Computing Within Limits, Jun 2025, Online. arXiv:2507.19094.

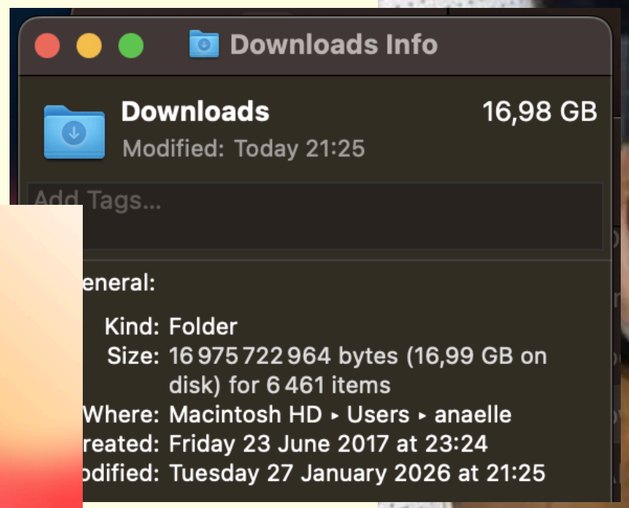
Use intensification :

a challenge to limit infrastructural expansion

- Use intensification as the opposite trajectory to use sufficiency
- Digital platforms foster always more unsustainable digital practices





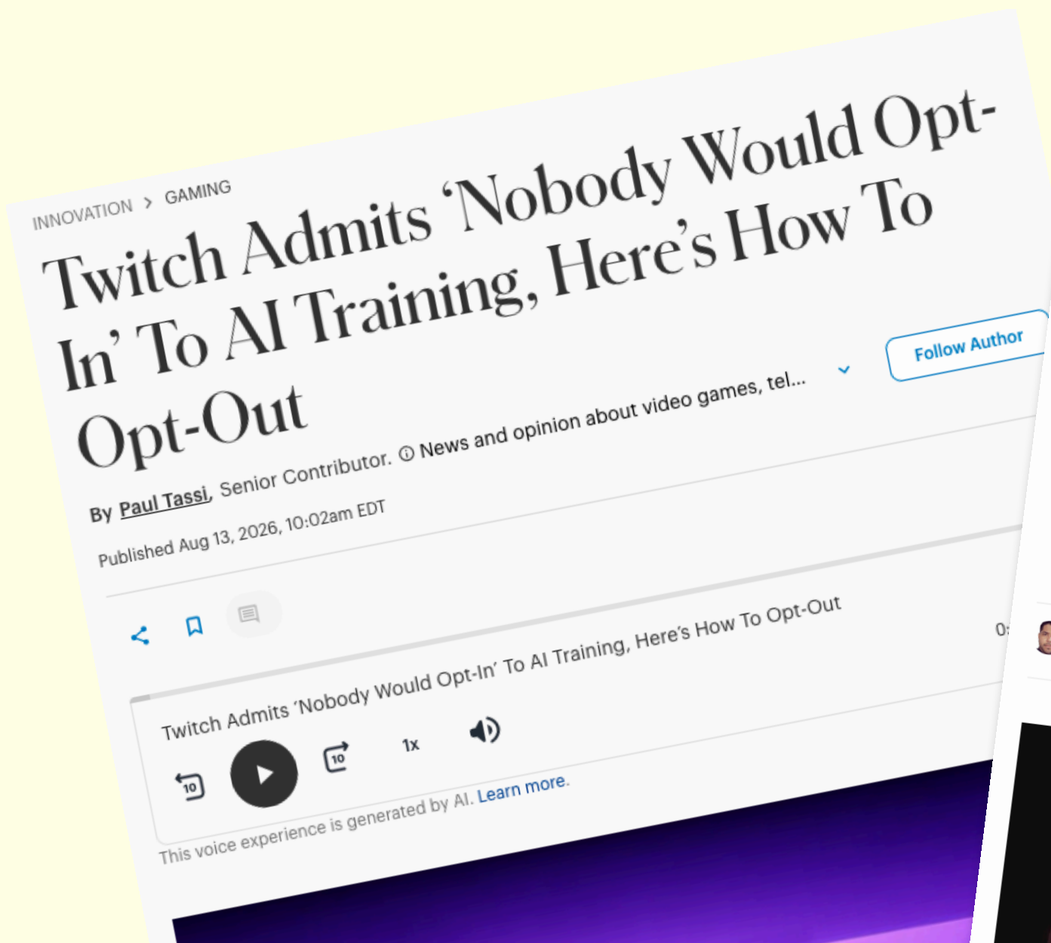


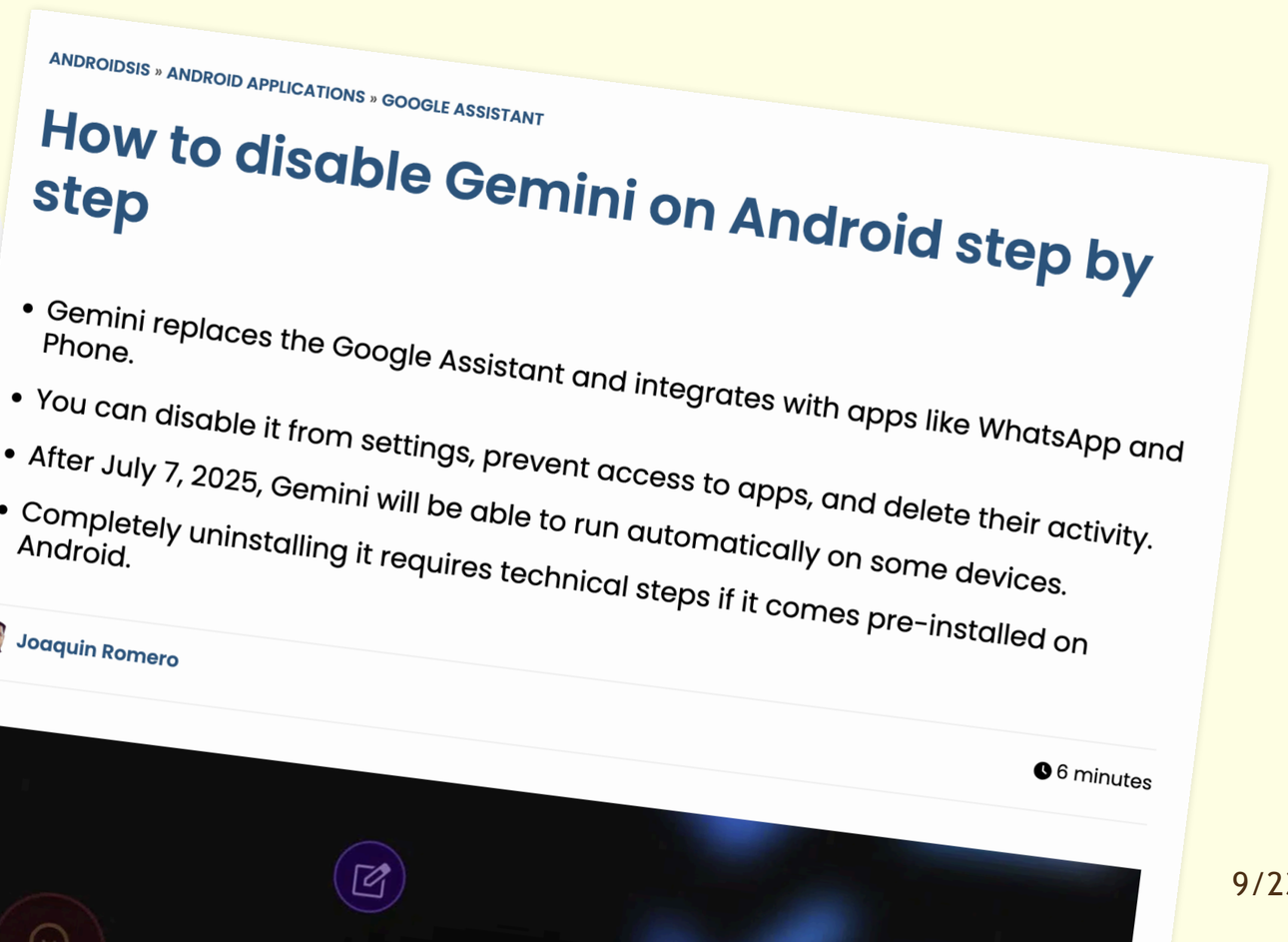


- Imposed use : the specific case of gen-AI
- The mechanisms behind use intensification
- Discussion on regulation opportunities

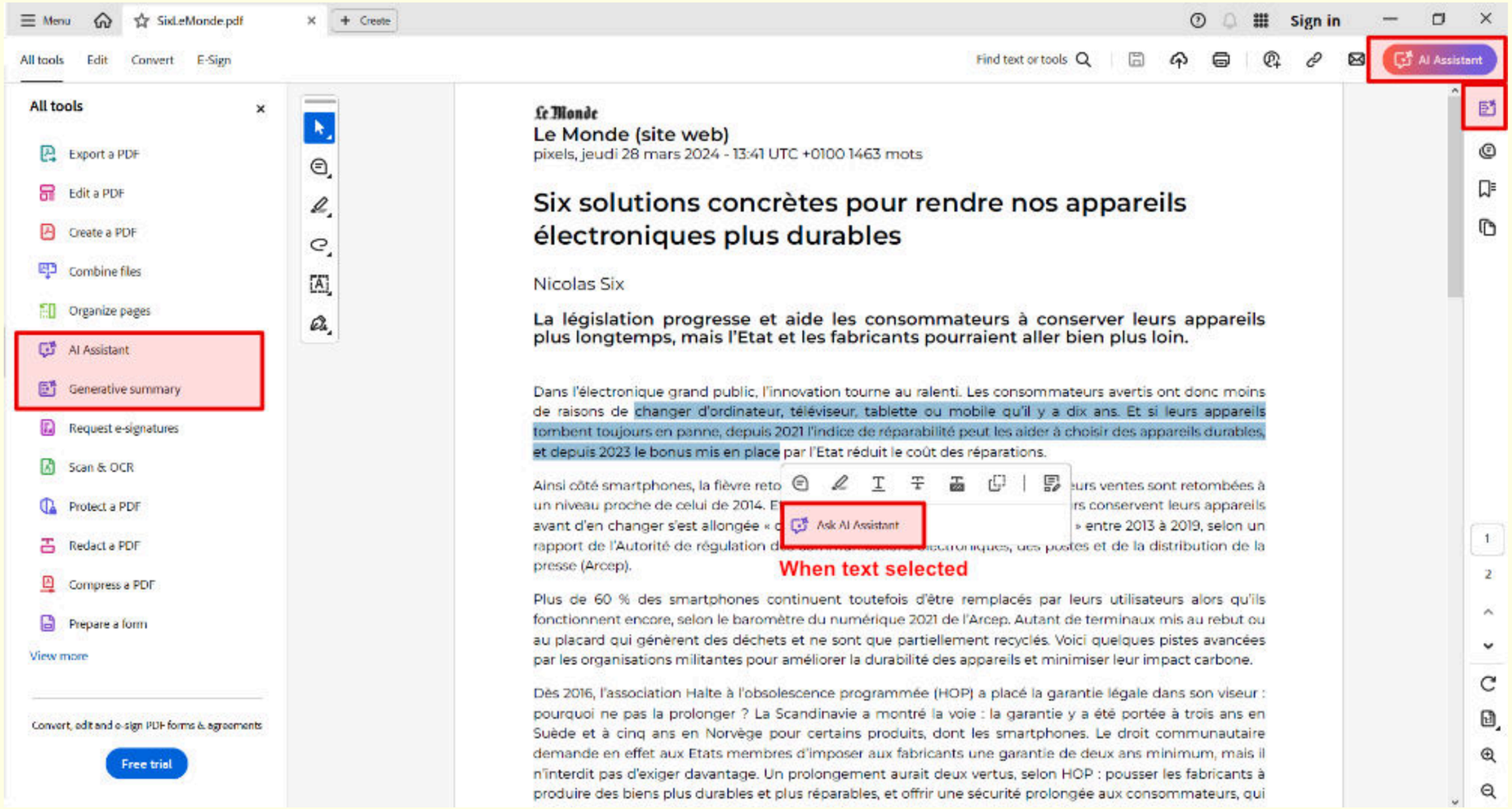
Imposed use : the specific case of gen-AI

- Where does the feeling that we are forced in using AI come from?





Imposed use : the specific case of gen-AI

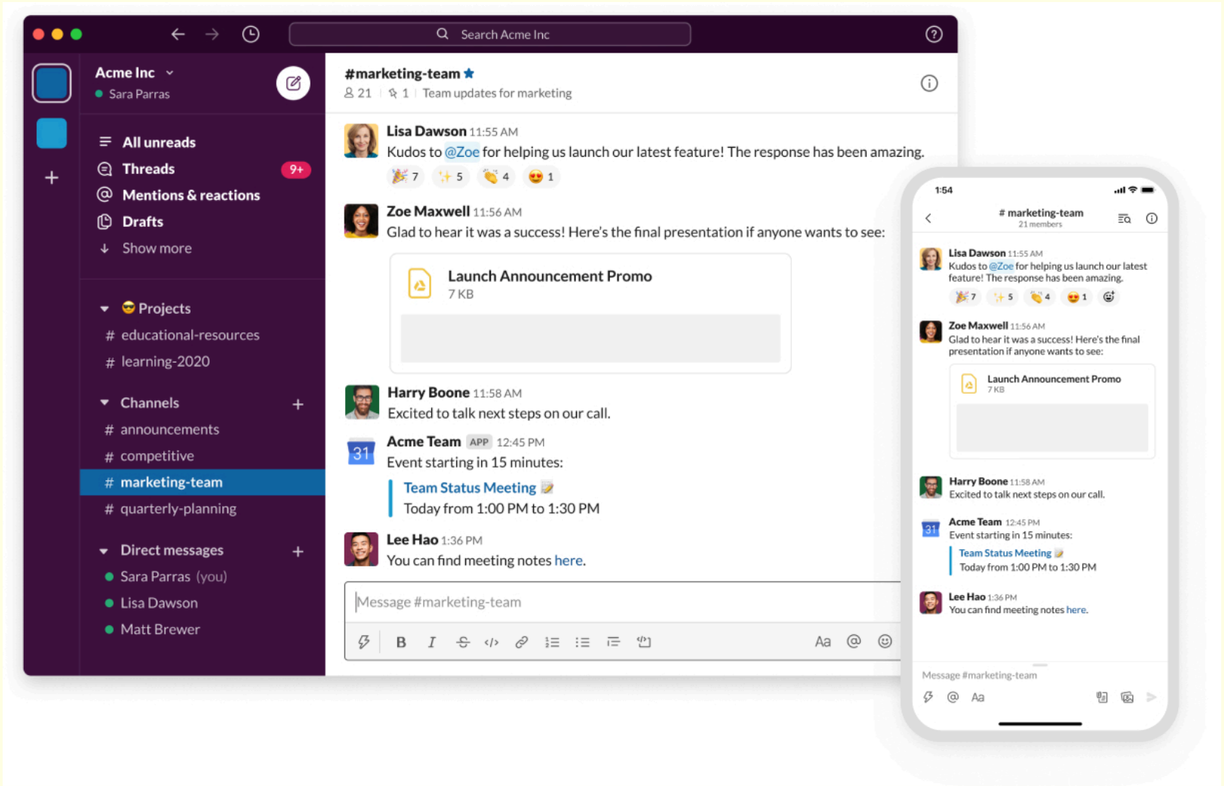


- Design choices that are beyond common sense of user experience design

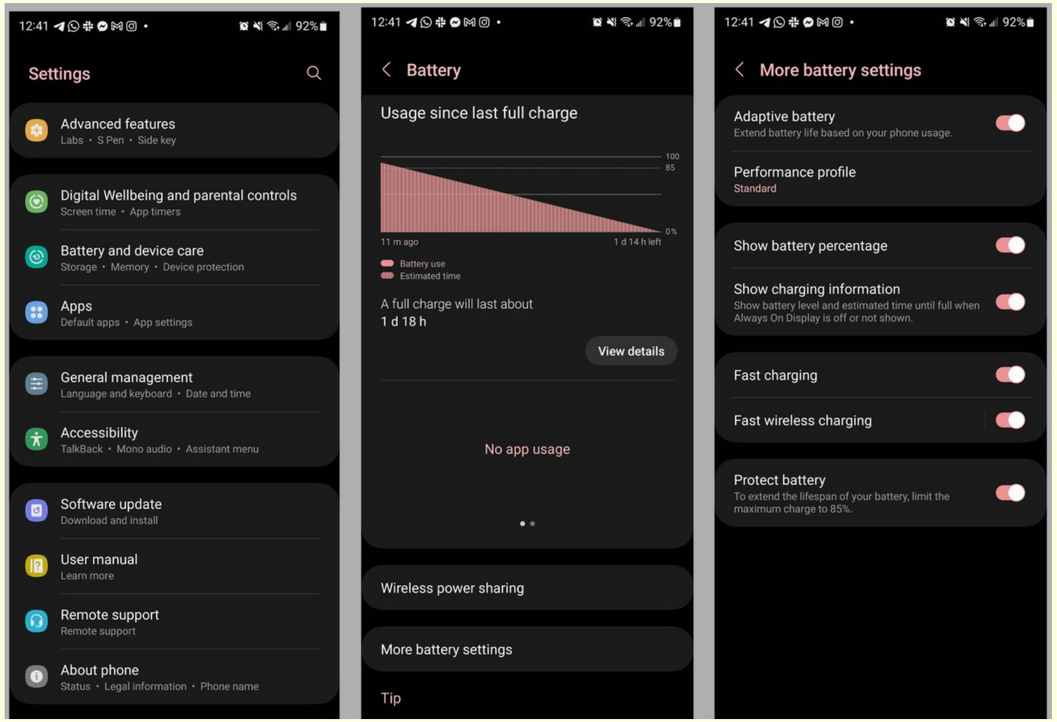
Imposed use : the specific case of gen-AI

- An unprecedented phenomenon of imposed technology use through interface design
- Unsustainable digital uses are also adopted trivially

Use intensification beyond forced adoption



Messaging Apps



Smartphone settings

Mechanisms behind use intensification



Whatsapp en 2010.
(webdesignmuseum.org)

Whatsapp aujourd'hui.

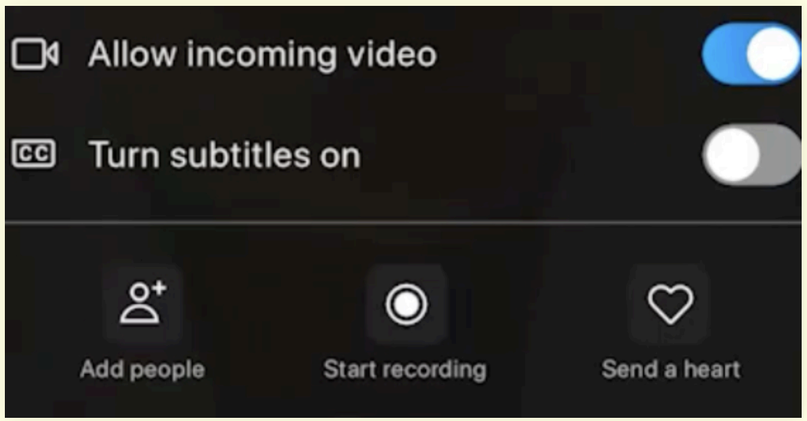
FEATURE INTENSIFICATION

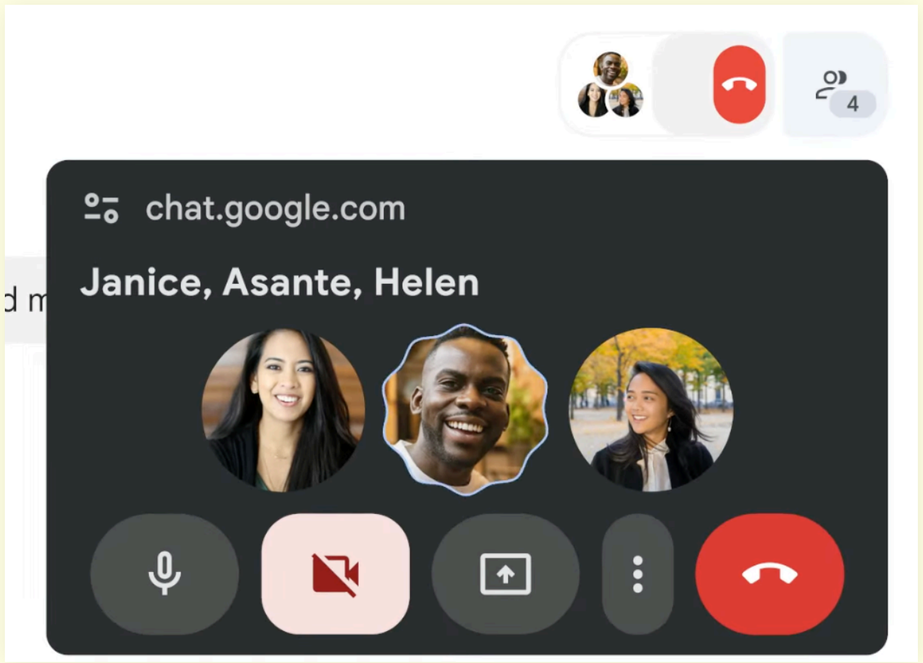
- Feature intensification is not only a technical issue

  (ex: upload limit for the size of files is increasing)

- Evolution of uses encouraged by the hierarchy of elements

Mechanisms behind use intensification





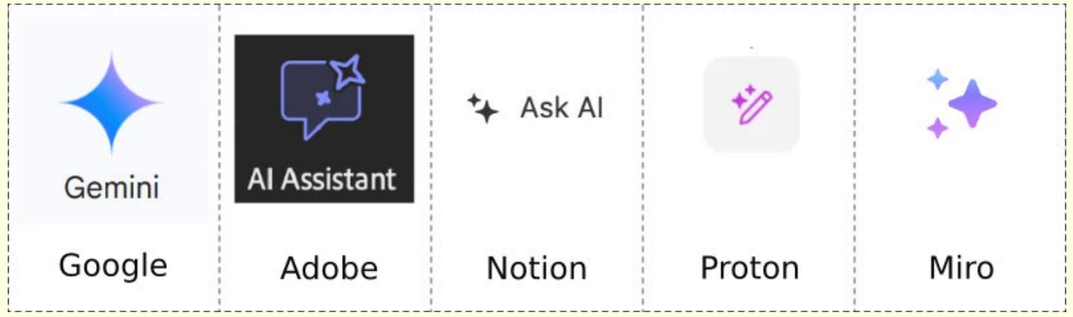
DEVICE DEPENDENCY

- Design choice contribute to dependency on **specific, recent and functioning digital devices**

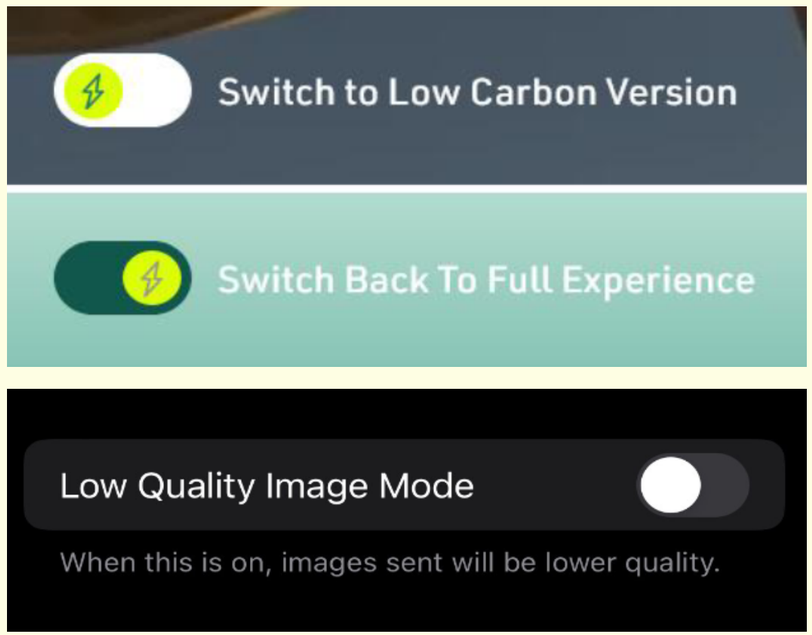
Mechanisms behind use intensification

NORMALIZATION OF INTENSIFIED USES

- Metaphors tend to promote intensive features
- Sufficiency-oriented features are presented as lesser options



The magic metaphor used for IA has a positive connotation

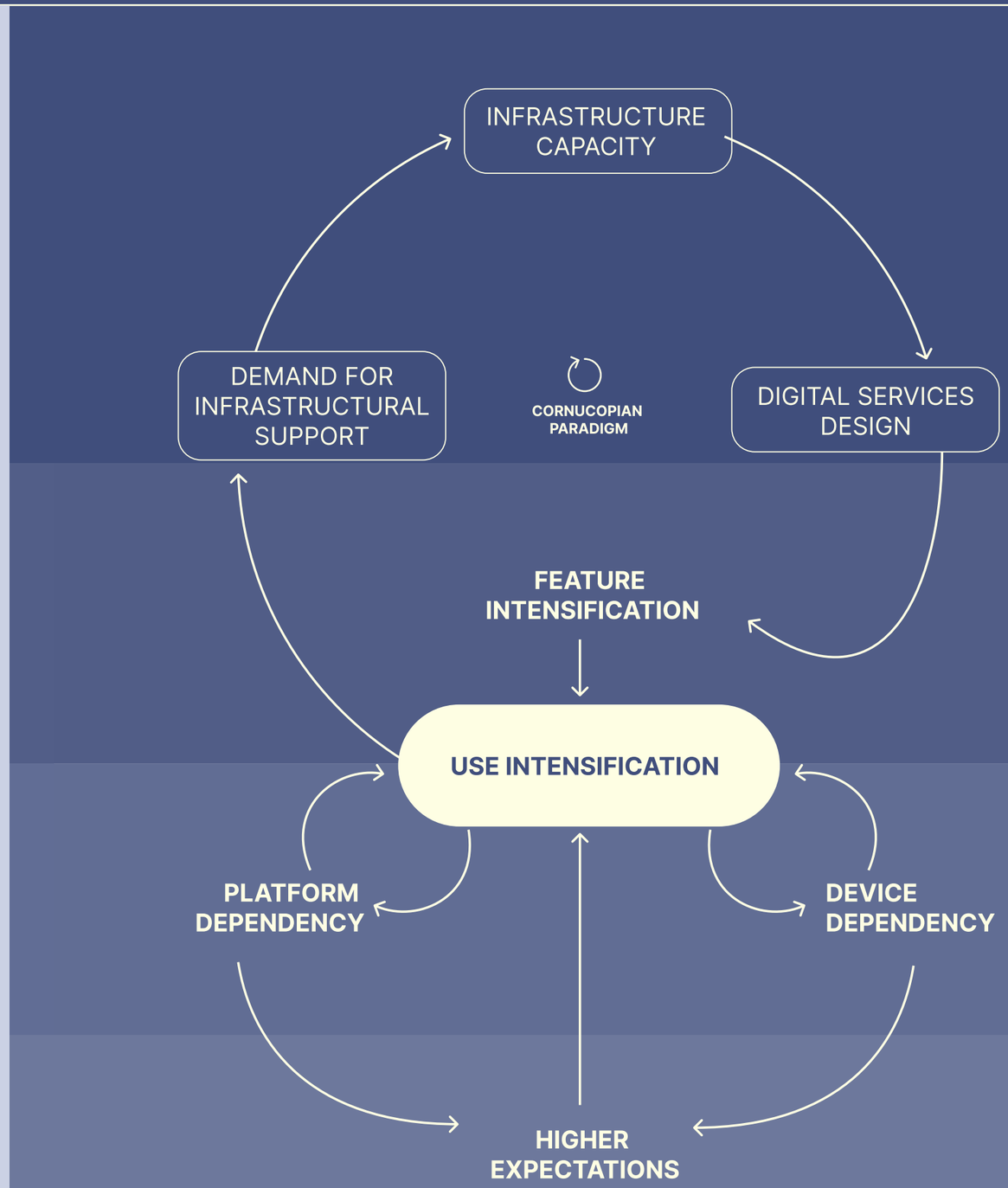


Smartphones parameters present sustainable uses as a lesser experience and not as the normal use.

DESIGN AND DIGITAL SUFFICIENCY

- Aggregative effects that lead to compelled use or premature device replacement

- Complicating users' efforts towards controlling their use of digital technologies



Inspirothèque

Une application de streaming très paramétrable

Source·s

newpipe.net

Stade d'avancement

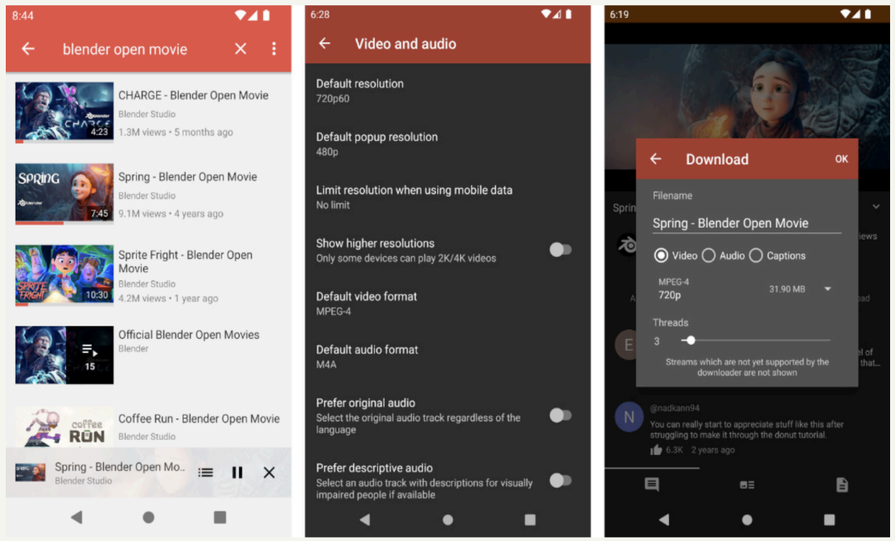
Industrialisé ou diffusé

Leviers

- Donner le contrôle de ses usages numériques
- Ouvrir le code
- Réduire ou limiter le temps d'usage
- Questionner les présupposés de la numérisation

License

Licence libre permissive — GPL-3.0



NewPipe est une application mobile Android open source, légère, respectueuse de la vie privée et paramétrable pour accéder aux vidéos YouTube, mais aussi à d'autres services (PeerTube, Soundcloud, etc).

Elle propose de nombreuses fonctionnalités habituellement inexistantes dans ce type d'application, comme :

- le téléchargement des vidéos dans la qualité de son choix pour les consulter hors ligne.

https://inspirotheque.limitesnumeriques.fr/

Regulations to support use sufficiency

SYSTEMIC DRIVERS OF USE INTENSIFICATION

- Maximization of user engagement is central in digital innovation
- Platform competition leads to platforms copying each-other's features
- Economic models (ad-based or freemium) lead to implementing data-intensive features

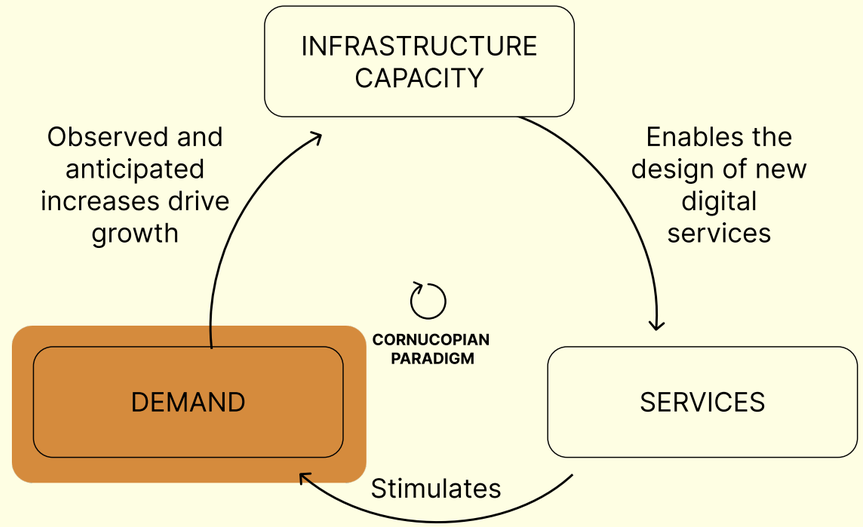
We are conducting workshops with lawyers and designers on how to regulate use intensification > reach out!

Regulations to support use sufficiency

Cloud-based software can evolve over night, users having little choice but to accept the evolution or leave.

- **A right/warranty to use moderation, ensuring that users can continue using a digital product for x years without having more difficulties to have a sufficient or moderate use.**

- **Solidifying interoperability measures, and fair market dispositions for alternatives to exist.**

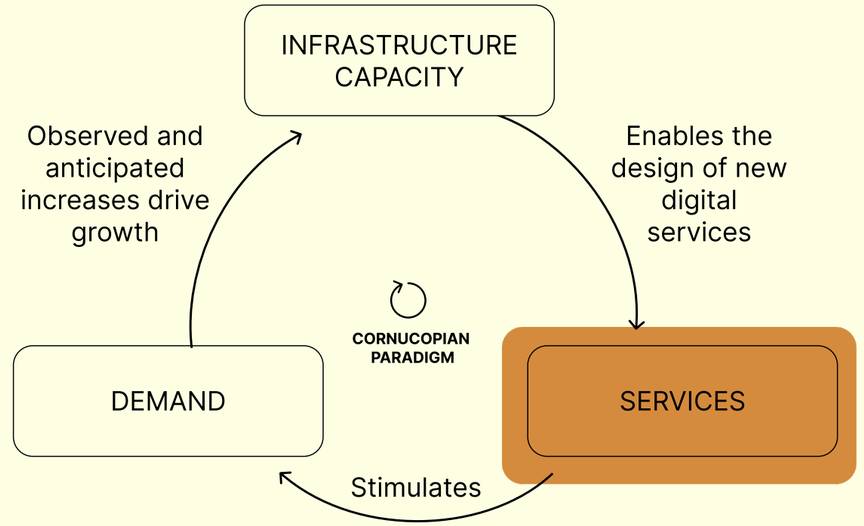


Regulations to support software sufficiency

So far, design choices are not bounded by the environmental consequences of technology development. Specific regulation on sufficiency should apply to :

- **A collectively defined list of types of features** *(eg: dark patterns or intensive patterns)* **and services that are unsustainable and that thus cannot be advertised or put forward in the same way as other features**

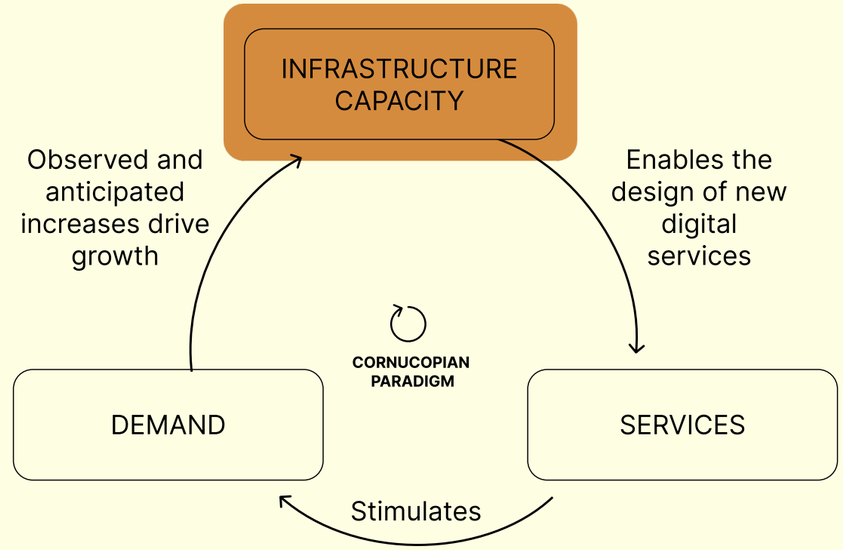
- **A collectively defined list of “critical services”, which are digital services that people usually cannot do without in the current society (eg: bank apps)**



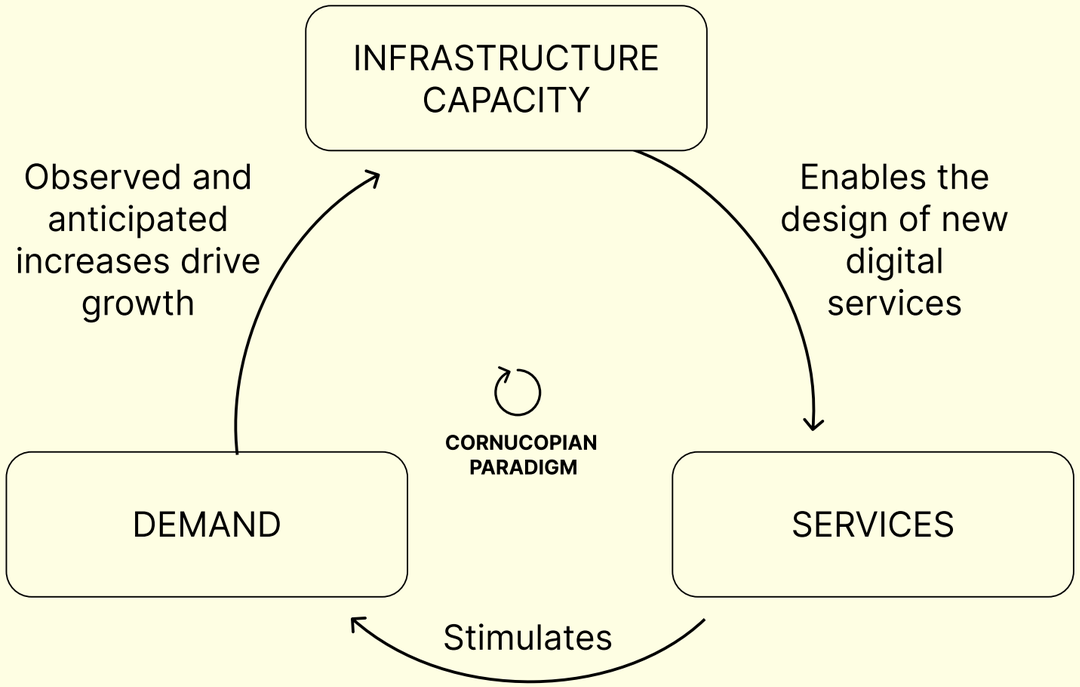
Regulations to support hardware sufficiency

Companies announce massive profits linked to increased usage while failing to account for this in their environmental reporting as rebound effects

- A legal framework for greenwashing on voluntary rebound effect
- Systemic effects (DSA) of digital products should also involve environmental ones
- Limitations of the AI Act: Reporting is based on computation rather than on energy consumption, and covers only the training phase.



Discussion



Where can limits to infrastructural expansion be collectively discussed ?

Which actors have power in this decision making?