

Literature review: on the shoulders of giants

For Innovation management

MdC. Fabio A. CRUZ SANCHEZ Pr. Mauricio Camargo

Université de Lorraine | ENSGI

2023-12-06

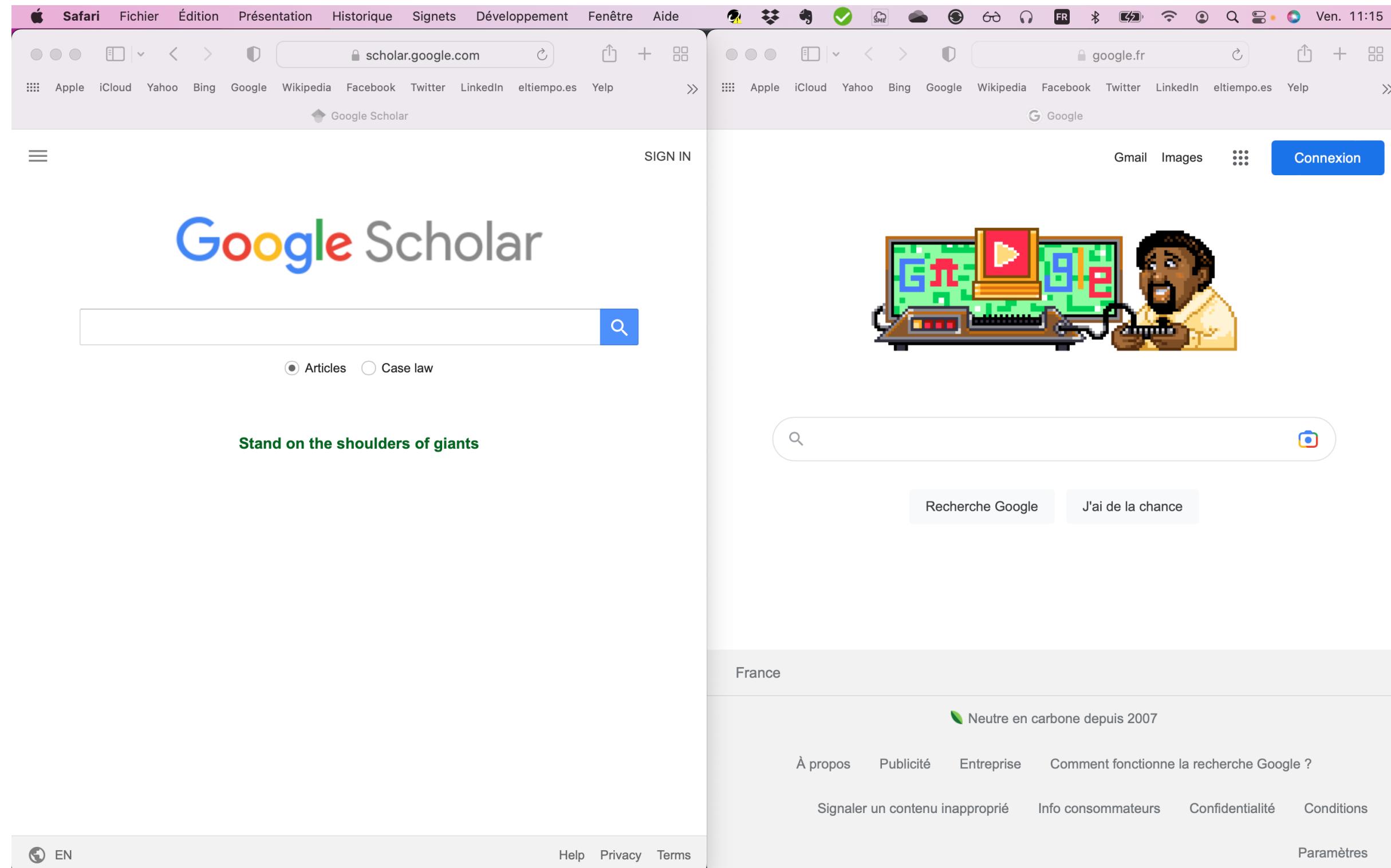
Learning objectives of this Workshop course

1. Know the importance of a literature review
2. Know-how look for scientific databases
3. Make a visualization of scientific landscapes

Agenda for today

- 1. Literature review – using what's already known**
2. What interest of literature review for a company?
3. Examples at ERPI

What the difference these two googles?



Peer Reviewing process

Peer Review Process

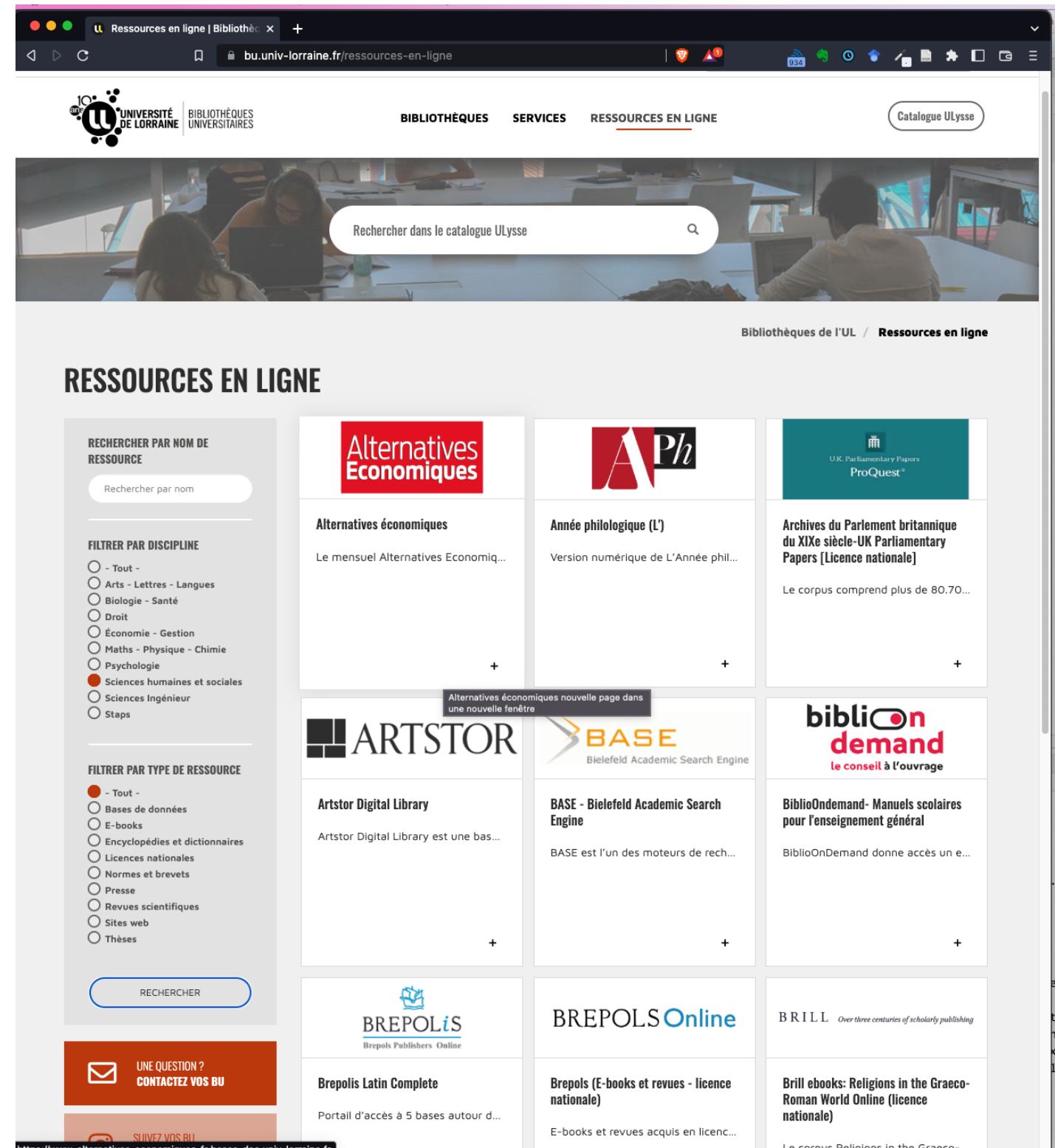


WILEY

Literature review

Standing on the shoulders of giants

- Scientific databases
- Research papers
- Books
- Institutional reports -> WHO, EU...
- Societies
 - conferences proceedings (IEEE, IAMOT, IFAC...)
- Institutional repositories -> dissertations
- IP registrars -> Patents



The screenshot shows the Université de Lorraine library website at bu.univ-lorraine.fr/ressources-en-ligne. The page features a header with the university logo, navigation links for BIBLIOTHÈQUES, SERVICES, and RESSOURCES EN LIGNE, and a search bar labeled "Rechercher dans le catalogue Ulysse". Below the header is a photograph of students studying in a library. The main content area is titled "RESSOURCES EN LIGNE" and displays a grid of online resource cards. The cards include:

- Alternatives Economiques**: Alternatives économiques, Le mensuel Alternatives Economique...
- Année philologique (L')**: Version numérique de L'Année philologique...
- U.K. Parliamentary Papers ProQuest***: Archives du Parlement britannique du XI^e siècle-UK Parliamentary Papers [Licence nationale]
- ARTSTOR**: Artstor Digital Library, Artstor Digital Library est une base de données...
- BASE**: BASE - Bielefeld Academic Search Engine, BASE est l'un des moteurs de recherche...
- biblioOn demand**: BiblioOndemand- Manuels scolaires pour l'enseignement général, BiblioOnDemand donne accès un ensemble...
- BREPOL*tis***: BREPOL*tis*, Brepols Publishers Online
- BREPOLOnline**: BREPOLOnline, Portail d'accès à 5 bases autour de la collection
- BRILL**: BRILL, Over three centuries of scholarly publishing
- Brill ebooks: Religions in the Graeco-Roman World Online (licence nationale)**: Brill ebooks: Religions in the Graeco-Roman World Online (licence nationale)

At the bottom of the page, there are contact links: "UNE QUESTION ? CONTACTEZ VOS BU" and "SUIVEZ VOS BU". The URL <https://www.alternatives-economiques.fr/bases-doc.univ-lorraine.fr> is also visible.

Agenda for today

1. Literature review – using what's already known
2. **What interest of literature review for a company?**
3. Examples at ERPI

Why a company would bother literature review ?

Technology Readiness → Maturity

The industrial emergence mapping framework.

R. Phaal et al. / Technological Forecasting & Social Change 78 (2011) 217–230

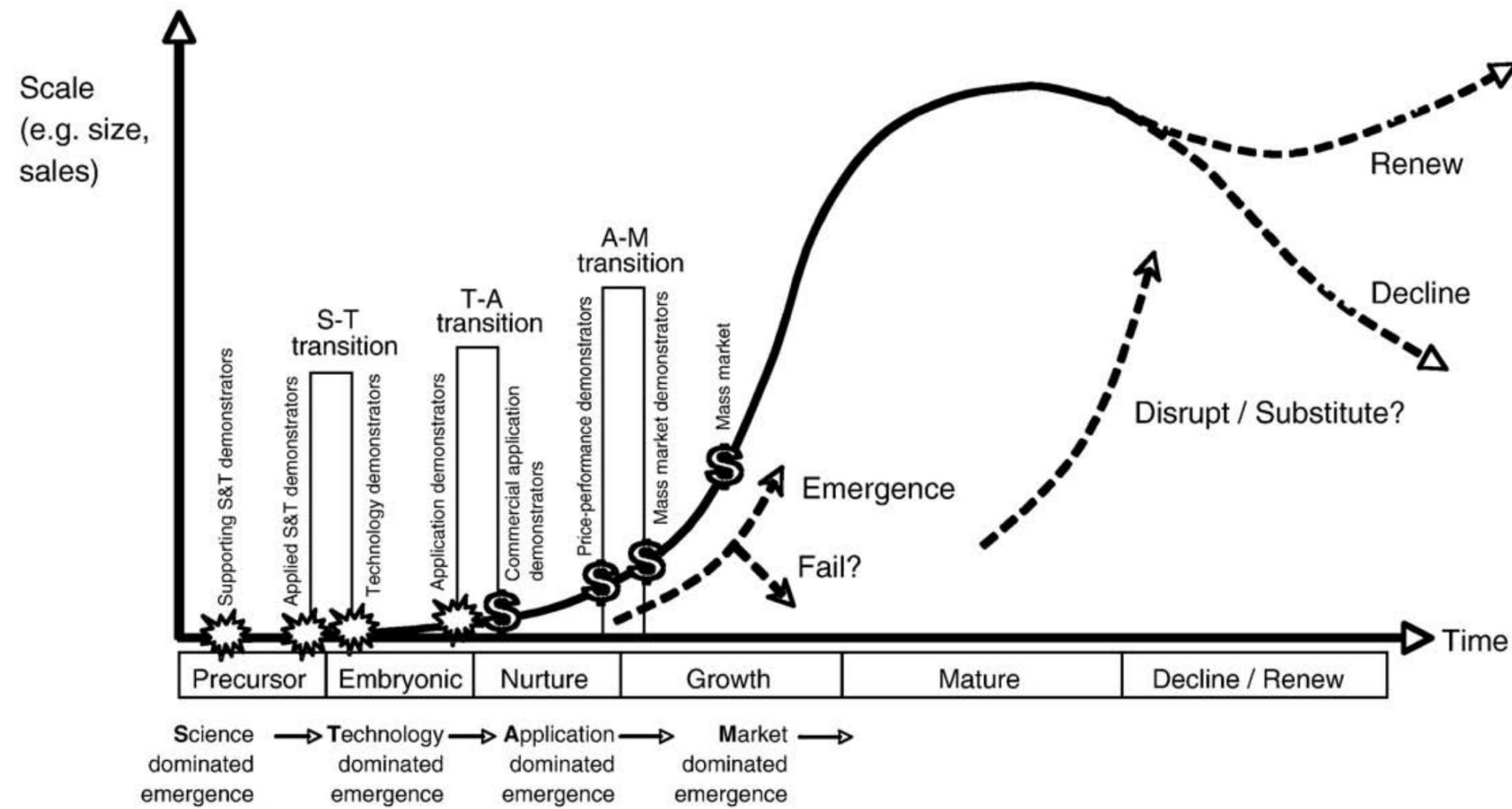
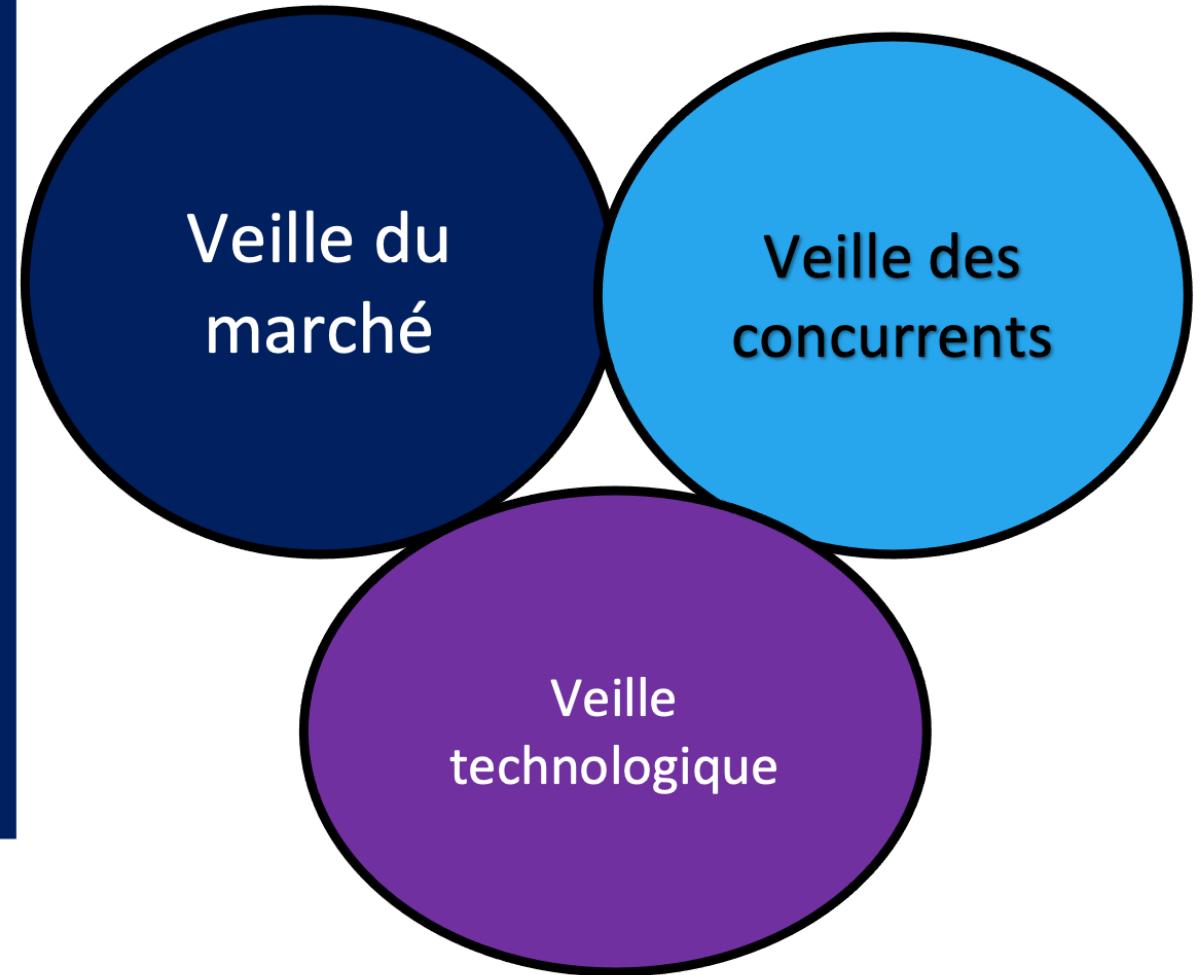


Fig. 2. Phases, transitions, milestones and trajectories of technology-intensive industrial emergence.

On the case of Enterprise

- Quels sont les inducteurs/tendances du marché?
- Quels sont les segments du marché à haute valeur ajoutée ?
- Qui sont les nouveaux acteurs?
- Quels besoins pour les marchés d'avenir?

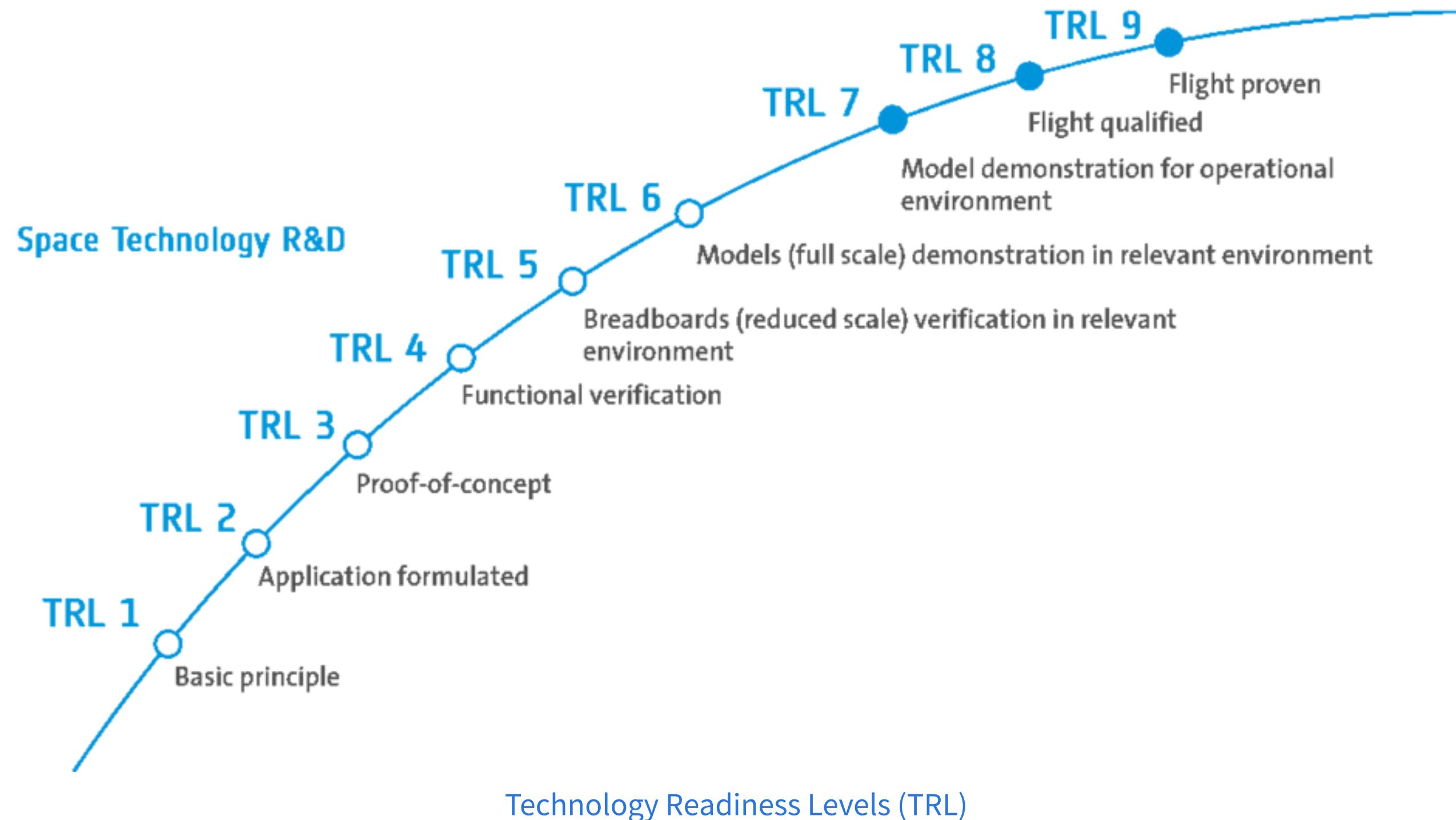


- Qui sont les compétiteurs « best-in-class » ?
- Quels sont les stratégies et marchés des différents acteurs?
- *Benchmark* des performances, coûts et ressources

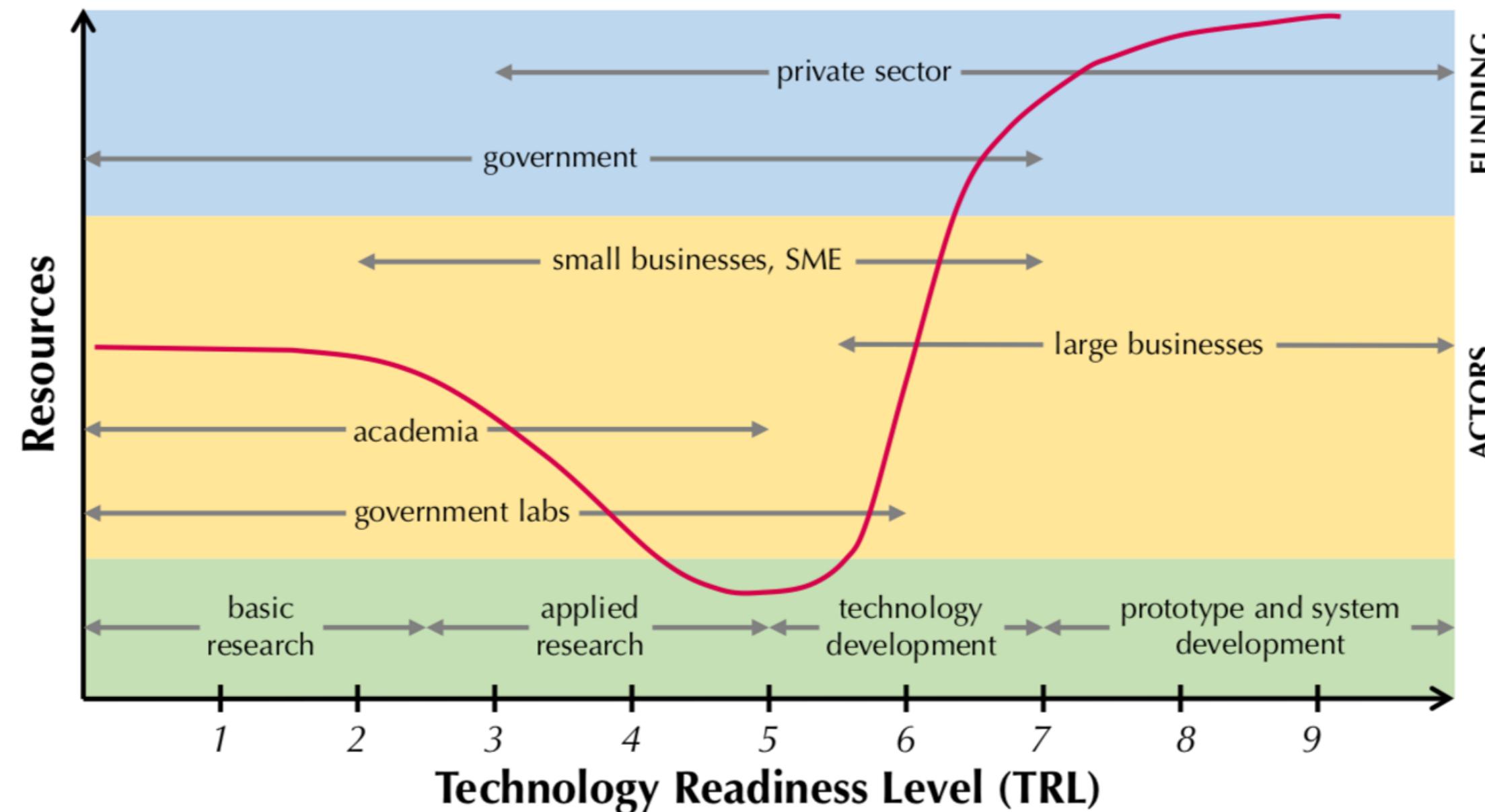
- Quel est *l'état de l'art* des domaines scientifiques ou des technologies de substitution? Quelle est la nature de la R&D actuelle? Quelles ruptures technologiques nous pouvons anticiper? Dans quelles technologies nos concurrents investissent ? A quel niveau? Dans quel délai?
- Quelles sont les opportunités et les menaces sur notre capacité technologique?

Technology Readiness → Levels

Framework developed in the Aeronautical field.

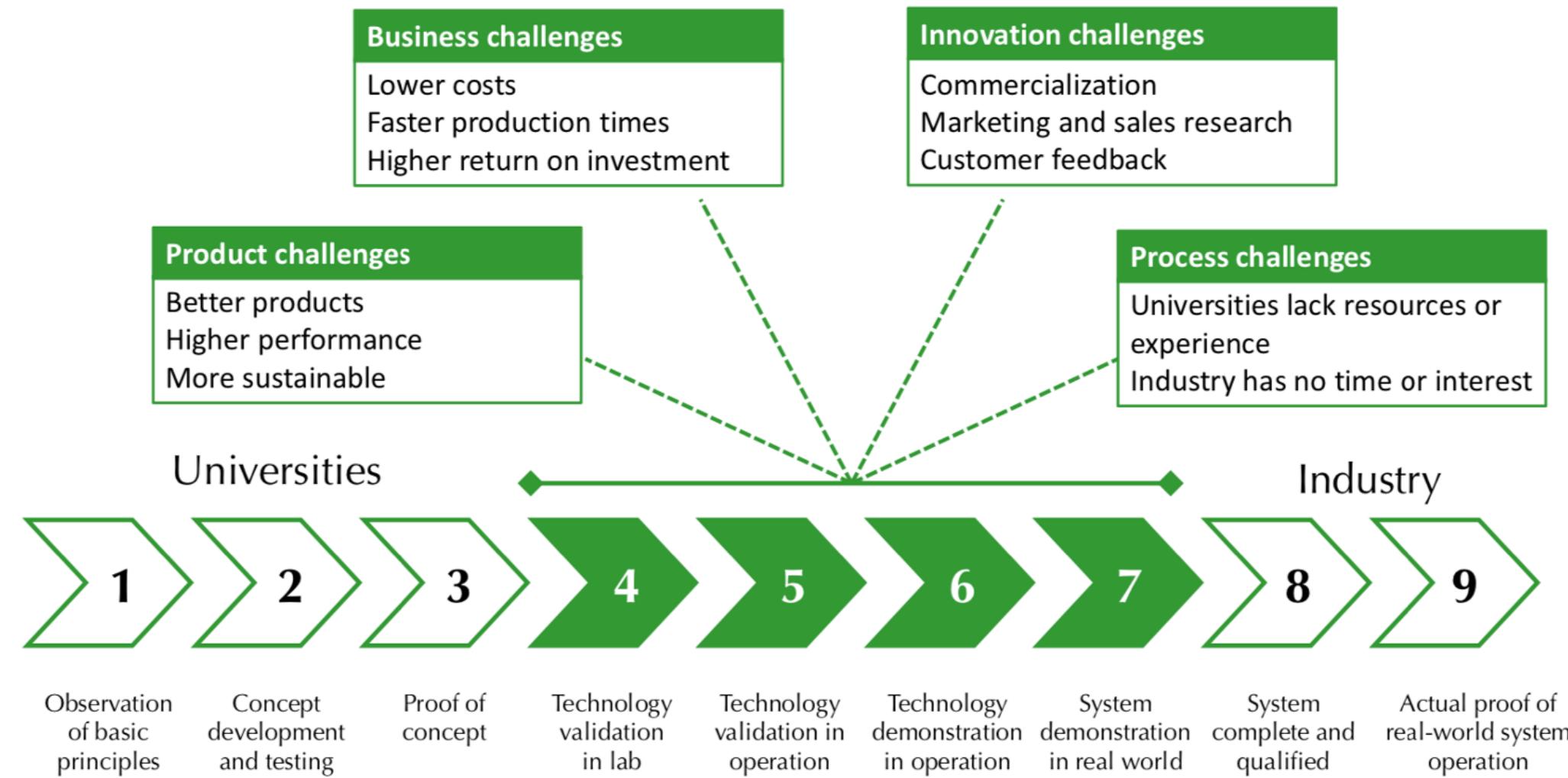


Technology Readiness → The Valley of Death



Source: Hensen, J., Loonen, R., Archontiki, M., Kanellis, M., 2015. Using building simulation for moving innovations across the “Valley of TD: Landscape of Research

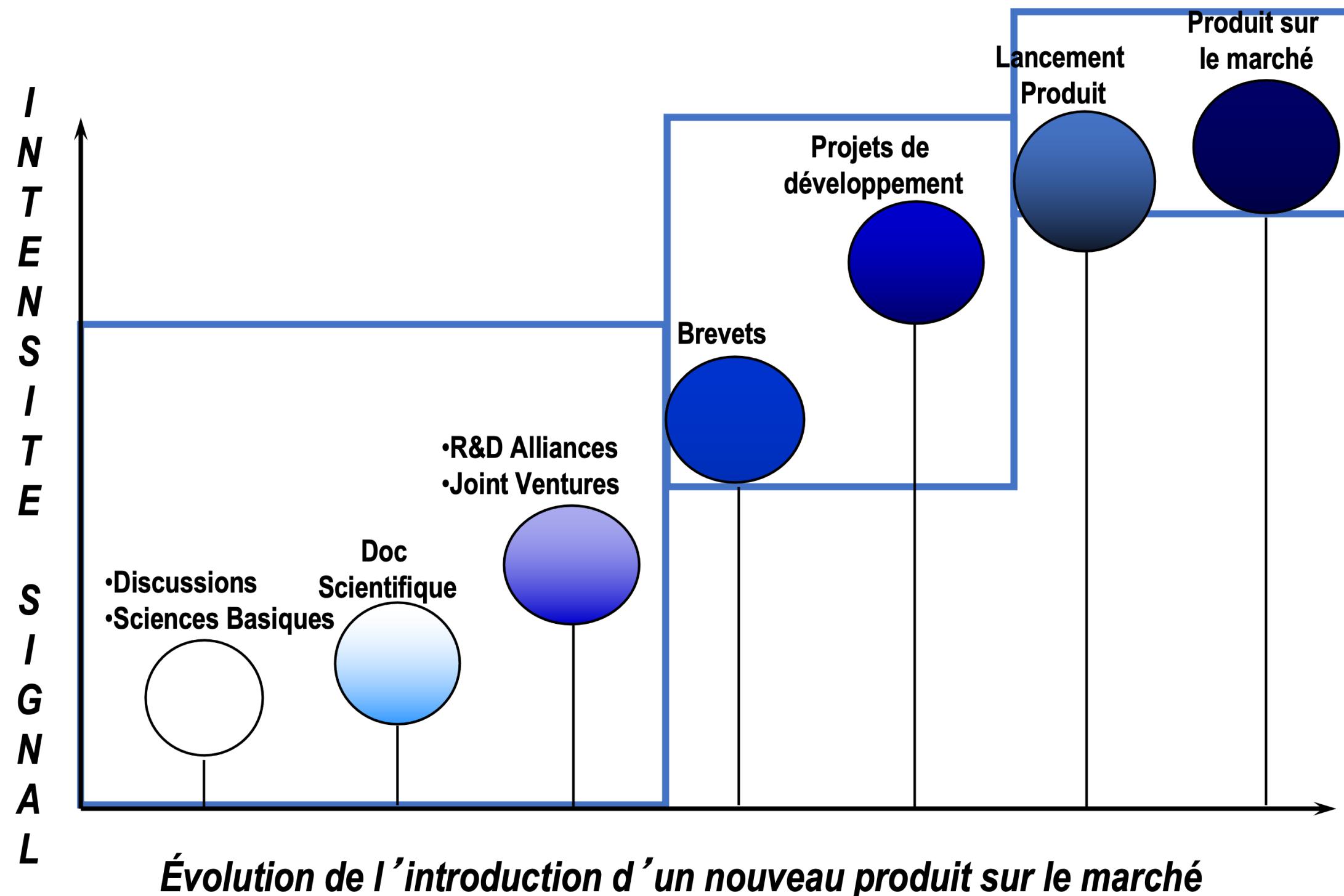
Technology Readiness → Challenges TRL4 - TRL7



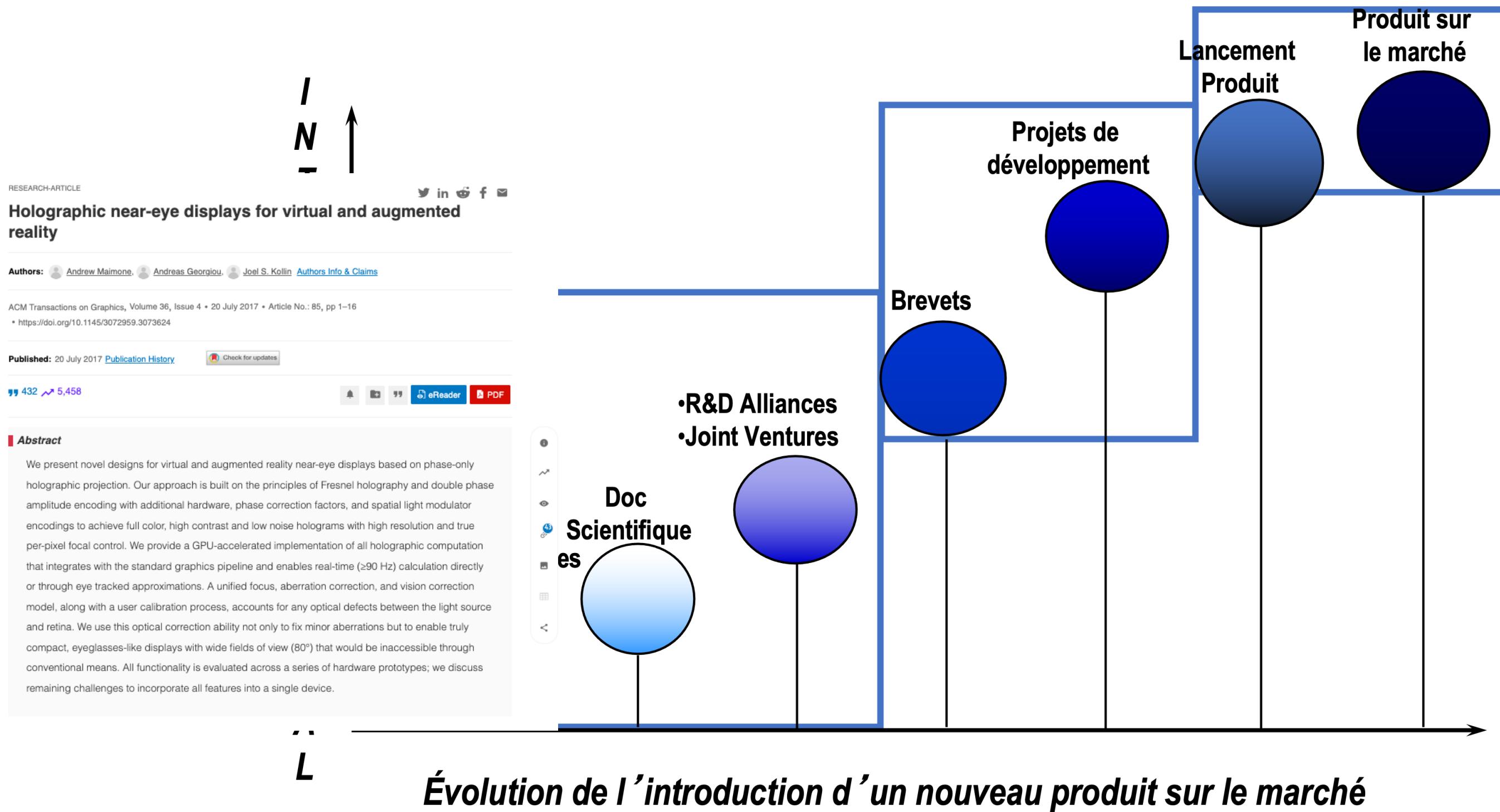
Technology Readiness → Challenges TRL4 - TRL7

- There is a **lack of tools** that can provide insights into **technology-integration** issues at an early R&D phase (TRL 1-5).
- This results in a **mismatch between information** need and availability and **complicates decision-making**.
- The process requires an **interdisciplinary approach**. The right combination of skills and expertise may not always be available

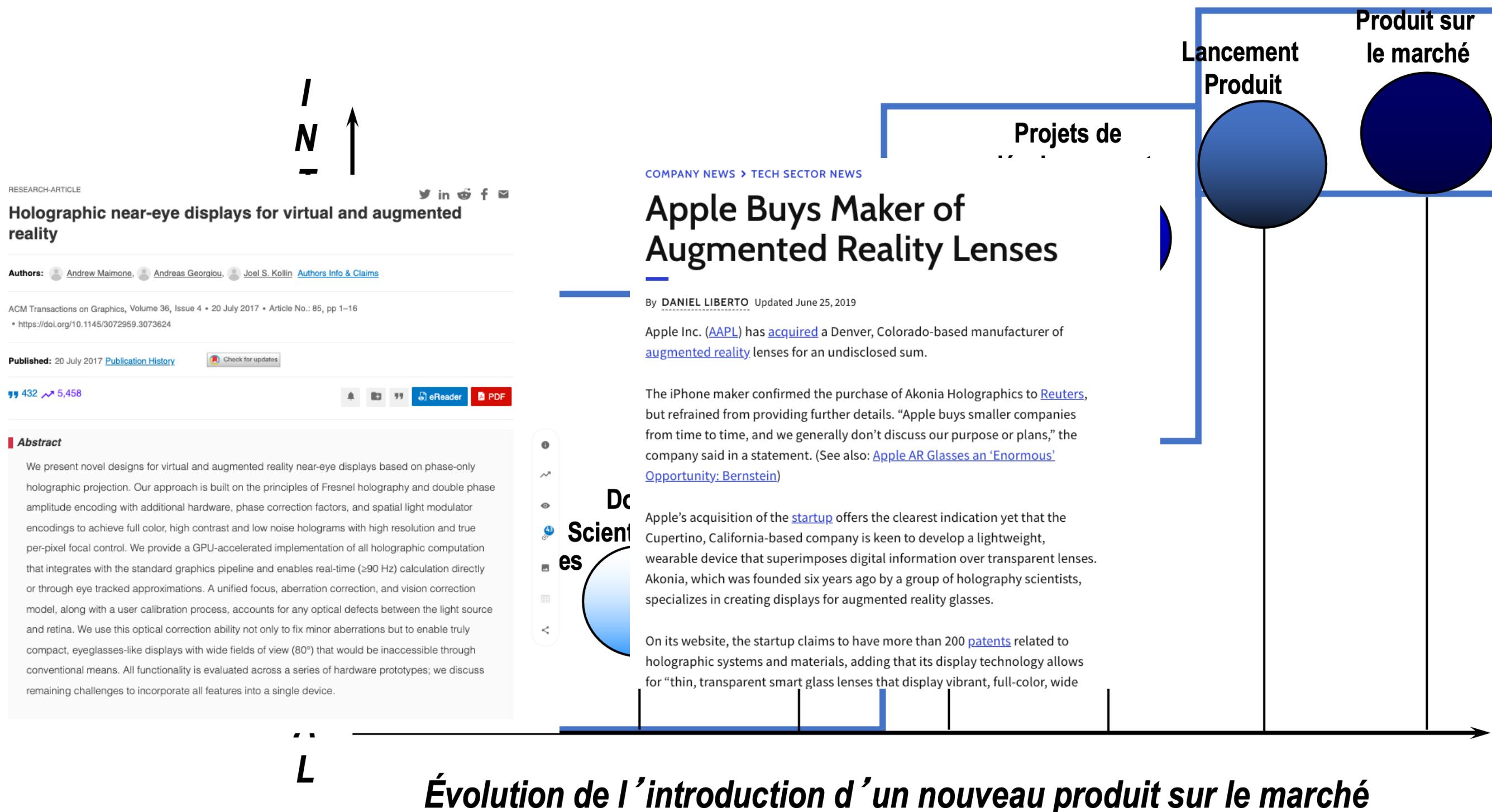
Technology Readiness → Evolution



Technology Readiness → Evolution



Technology Readiness → Evolution



Technology Readiness → Evolution

I

RESEARCH-ARTICLE

Holographic near-eye displays for virtual and augmented reality

Authors: Andrew Maimone, Andreas Georgiou, Joel S. Kollin [Authors Info & Claims](#)

ACM Transactions on Graphics, Volume 36, Issue 4 • 20 July 2017 • Article No.: 85, pp 1–16
<https://doi.org/10.1145/3072959.3073624>

Published: 20 July 2017 [Publication History](#) [Check for updates](#)

432 5,458 [eReader](#) [PDF](#)

Abstract

We present novel designs for virtual and augmented reality near-eye displays based on phase-only holographic projection. Our approach is built on the principles of Fresnel holography and double phase amplitude encoding with additional hardware, phase correction factors, and spatial light modulator encodings to achieve full color, high contrast and low noise holograms with high resolution and true per-pixel focal control. We provide a GPU-accelerated implementation of all holographic computation that integrates with the standard graphics pipeline and enables real-time (≥ 90 Hz) calculation directly or through eye tracked approximations. A unified focus, aberration correction, and vision correction model, along with a user calibration process, accounts for any optical defects between the light source and retina. We use this optical correction ability not only to fix minor aberrations but to enable truly compact, eyeglasses-like displays with wide fields of view (80°) that would be inaccessible through conventional means. All functionality is evaluated across a series of hardware prototypes; we discuss remaining challenges to incorporate all features into a single device.

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ces**

Projets de

COMPANY NEWS > TECH SECTOR NEWS

Apple Buys Maker of Augmented Reality Lenses

By DANIEL LIBERTO Updated June 25, 2019

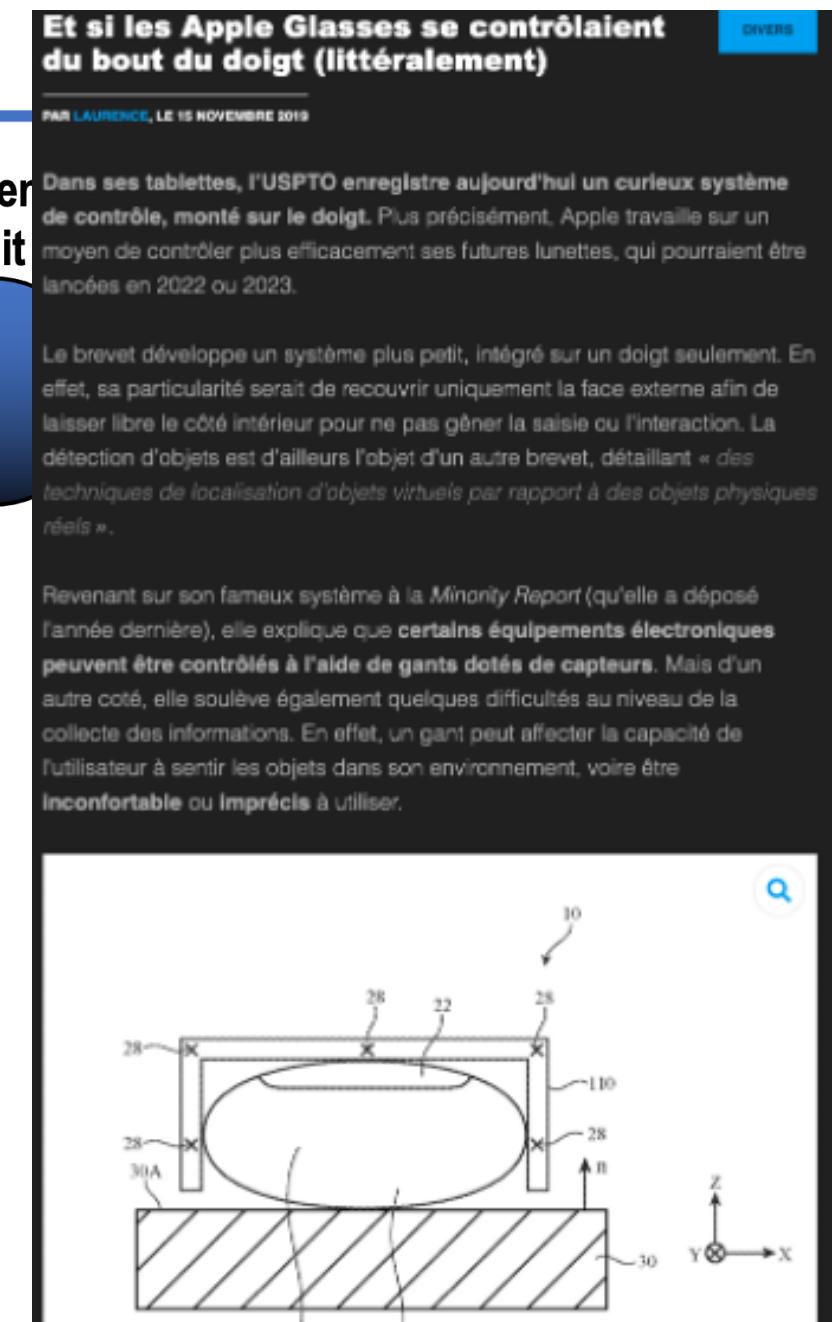
Apple Inc. (AAPL) has [acquired](#) a Denver, Colorado-based manufacturer of [augmented reality](#) lenses for an undisclosed sum.

The iPhone maker confirmed the purchase of Akonia Holographics to [Reuters](#), but refrained from providing further details. "Apple buys smaller companies from time to time, and we generally don't discuss our purpose or plans," the company said in a statement. (See also: [Apple AR Glasses an 'Enormous' Opportunity: Bernstein](#))

Apple's acquisition of the [startup](#) offers the clearest indication yet that the Cupertino, California-based company is keen to develop a lightweight, wearable device that superimposes digital information over transparent lenses. Akonia, which was founded six years ago by a group of holography scientists, specializes in creating displays for augmented reality glasses.

On its website, the startup claims to have more than 200 [patents](#) related to holographic systems and materials, adding that its display technology allows for "thin, transparent smart glass lenses that display vibrant, full-color, wide

Lancemen
Produit



L
Évolution de l'introduction d'un nouveau produit sur le marché

Technology Readiness → Evolution



Lancement Produit

Projets de

COMPANY NEWS > TECH SECTOR NEWS

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Et si les Apple Glasses se contrôlaient du bout du doigt (littéralement)

Lancement Produit

Projets de

COMPANY NEWS > TECH SECTOR NEWS

Et si les Apple Glasses se contrôlaient du bout du doigt (littéralement)

Dans ses tablettes, l'USPTO enregistre aujourd'hui un curieux système de contrôle, monté sur le doigt. Plus précisément, Apple travaille sur un moyen de contrôler plus efficacement ses futures lunettes, qui pourraient être lancées en 2022 ou 2023.

Le brevet développe un système plus petit, intégré sur un doigt seulement. En effet, sa particularité serait de recouvrir uniquement la face externe afin de laisser libre le côté intérieur pour ne pas gêner la saisie ou l'interaction. La détection d'objets est d'ailleurs l'objet d'un autre brevet, détaillant « des techniques de localisation d'objets virtuels par rapport à des objets physiques réels ».

Revenant sur son fameux système à la *Minority Report* (qu'elle a déposé l'année dernière), elle explique que certains équipements électroniques peuvent être contrôlés à l'aide de gants dotés de capteurs. Mais d'un autre côté, elle soulève également quelques difficultés au niveau de la collecte des informations. En effet, un gant peut affecter la capacité de l'utilisateur à sentir les objets dans son environnement, voire être inconfortable ou imprécis à utiliser.

Evolution de l'introduction d'un nouveau produit sur le marché

Technology Readiness → Evolution



Apple Glass : date de sortie, prix, fiche technique

PAR ROMAIN
LE 16/05/2023

PAR ROMAIN
LE 16/05/2023

16 COM'S

SOMMAIRE

Apple travaille sur des lunettes connectées désignées à ce stade par leur nom informel « Apple Glass ». L'accessoire semble l'aboutissement d'une offensive soutenue d'Apple dans la réalité virtuelle et augmentée. Voici toutes les informations disponibles concernant ce produit dont le développement a été mis en pause.



Crédits : Phonandroid

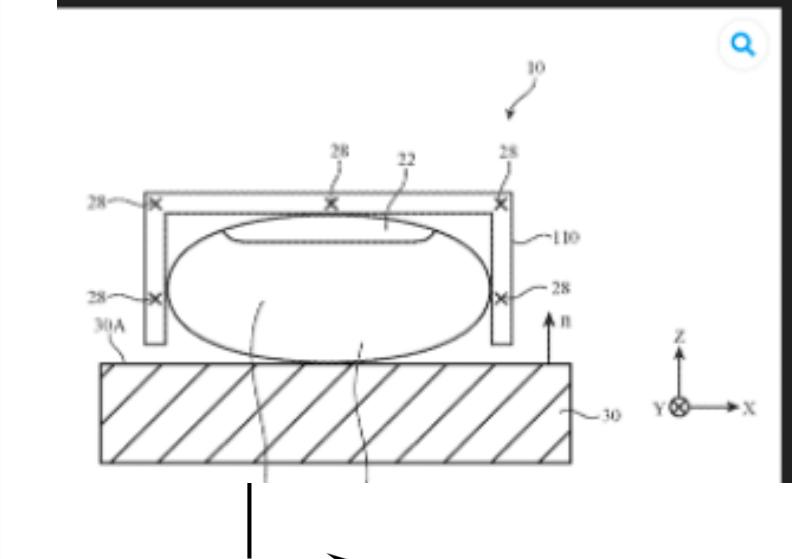
Et si les Apple Glasses se contrôlaient du bout du doigt (littéralement)

L'ESTRÉE, LE 15 NOVEMBRE 2019

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Web of science → Scientific & Patent databases



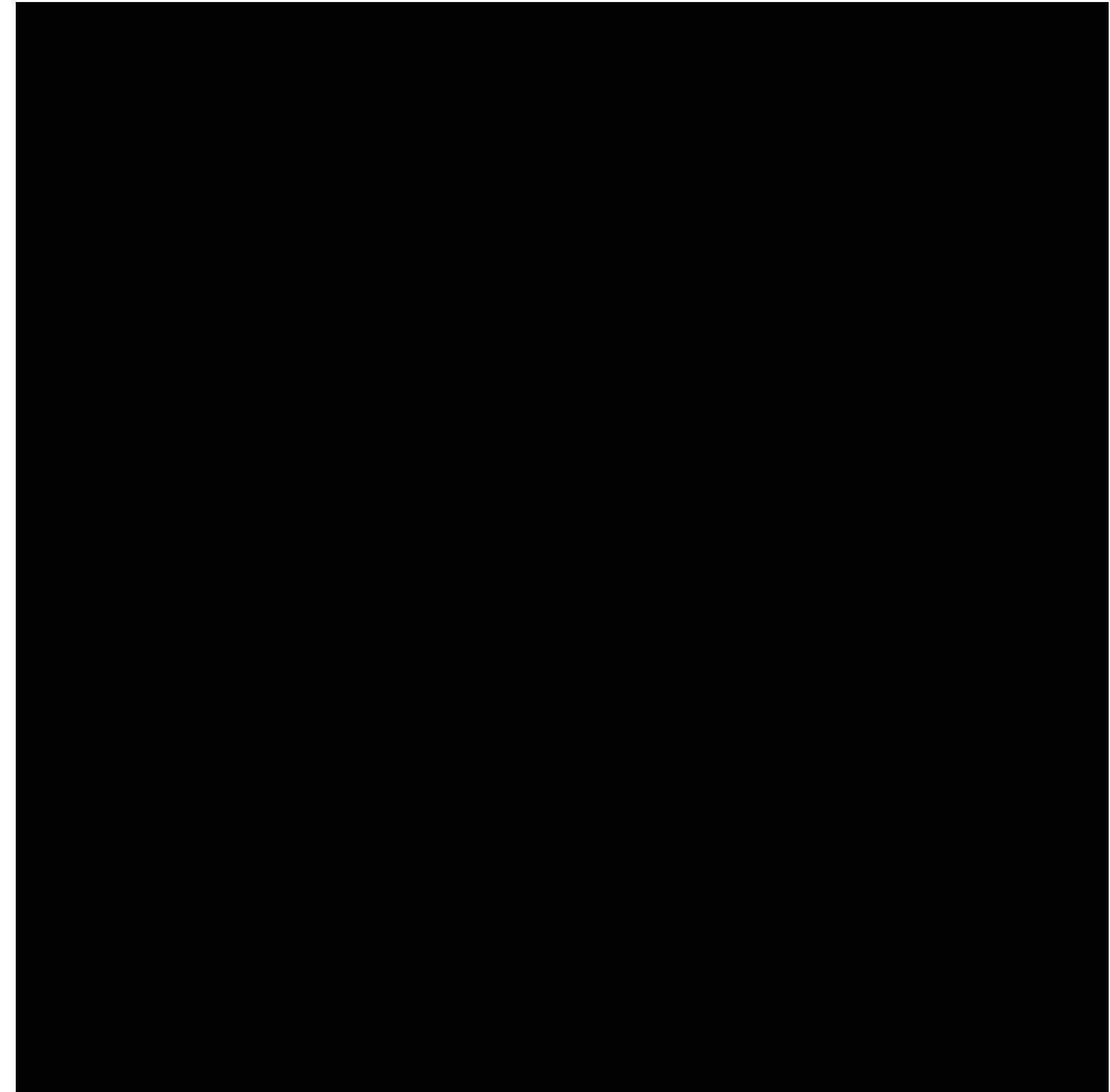
This screenshot shows the 'DOCUMENTS' section of the Web of Science search interface. The top navigation bar includes 'Web of Science™', 'Search', 'Sign In', and 'Register'. On the left, there's a vertical menu with icons for 'MENU', 'FOLDER', 'PERSON', and 'BELL'. The main area has tabs for 'DOCUMENTS' and 'RESEARCHERS'. A search bar says 'Search in: [Web of Science Core Collection](#) ^ Editions: All'. Below it, a sidebar lists various databases: 'All Databases', 'Web of Science Core Collection' (which is selected and highlighted in purple), 'BIOSIS Citation Index', 'Current Contents Connect', 'Data Citation Index', 'Derwent Innovations Index', 'KCI-Korean Journal Database', 'MEDLINE®', 'SciELO Citation Index', and 'Zoological Record'. A button '+ Add more' is at the bottom. To the right, a detailed description of the 'Web of Science Core Collection (1950-present)' is provided, mentioning its scope, indexed references, and citation tracking features. The date 'Data updated 2023-07-01' is at the bottom.

Core Collections

This screenshot shows the 'DOCUMENTS' section of the Web of Science search interface, similar to the one above but with different database options. The top navigation bar, sidebar, and search bar are identical. The sidebar lists: 'All Databases', 'Web of Science Core Collection', 'BIOSIS Citation Index', 'Current Contents Connect', 'Data Citation Index', 'Derwent Innovations Index' (selected and highlighted in purple), 'KCI-Korean Journal Database', 'MEDLINE®', 'SciELO Citation Index', and 'Zoological Record'. A button '+ Add more' is at the bottom. To the right, a detailed description of the 'Derwent Innovations Index (1966-present)' is provided, mentioning its unique patent information from over 50 patent issuing authorities. It also lists specific features like patent titles, abstracts, and classification codes. The date 'Data updated 2023-07-01' is at the bottom.

Derwent Innovations Index

So..

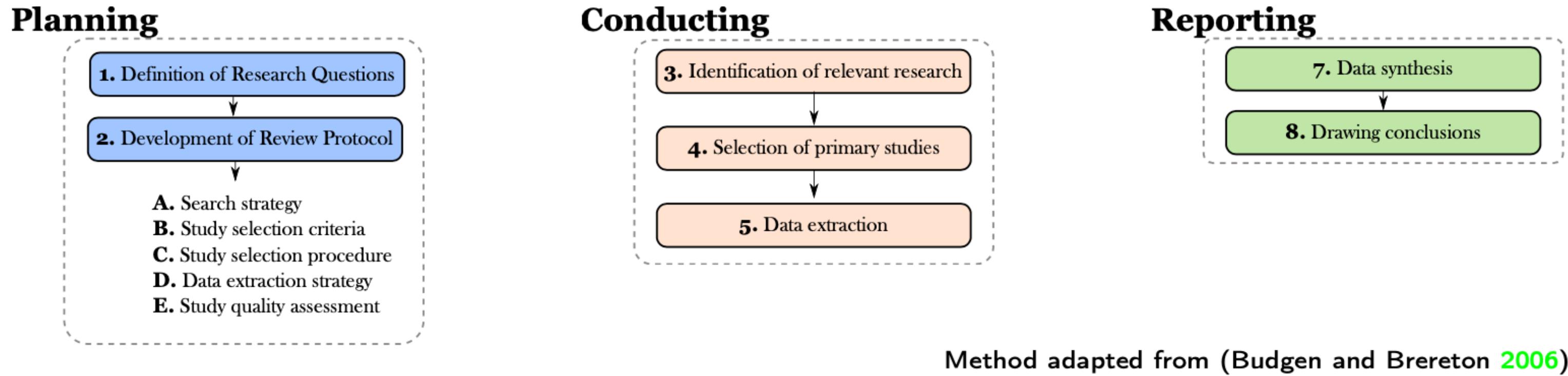


Agenda for today

1. Literature review – using what's already known
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How to do a Literature Review?

Literature review



Steps for a Literature Review

Literature review: The Context



Take the time to planning because it has the major impact at the end.

Literature review: Planning

Goal: Identification of material recycling approaches in the Additive Manufacturing contexts
(commercial and open-source)

1. Research Questions (RQ):

Global

RQ1: How much research activity has there been about recyclability in the Additive Manufacturing Context?

Specific

RQ2: What are the developments of open-source additive manufacturing in the polymer recycling context?

Literature review: Planning

2. Development of the review protocol

A. Search strategy:

Keyword group 1 (Additive manufacturing..)	Keyword group 2 (Recycling.)	Keyword group 3 (Polymer..)
3D Printing Additive manufacturing Rapid prototyping Fused Filament Fabrication Open source additive manufacturing Low cost additive manufacturing Melt extrusion manufacturing Extrusion-based systems	Recycling Reuse	Polymer Plastic

Subjet + Verb + Complement → Topic + Context + Problem

Literature review: Planning

2. Development of the review protocol

A. Search strategy:

Approach	Population			Intervention	
Global	((3D print*) OR (additive manufacturing)) OR (rapid prototyping))	AND		(recycl*) OR (reus*)	
Specific	(3D print*) OR (extrusion-based systems) OR (melt extrusion manufacturing) OR (fused filament fabrication)OR ((open source OR low cost) AND (additive manufacturing))	AND	(recycl*) OR (reus*)	AND	(polymer) OR (plastic)

Literature review: Planning

2. Development of the review protocol

D. Data Extraction Strategy:

ID	Property	Observations
P1	Additive Manufacturing process	Categorization of the AM process
P2	Material state in the AM process	Liquid, Powder, Filament, Sheet
P3	Material	Reference of the material used in the paper
P4	Characterization methods for the feedstock material	Methods for evaluate the quality of the AM feedstock material
P5	Characterization methods for the recycled printed part	Evaluation test used to the printed part in order to assess the quality
P6	Variables to control the quality of recycled material	AM parameters used to control the material degradation

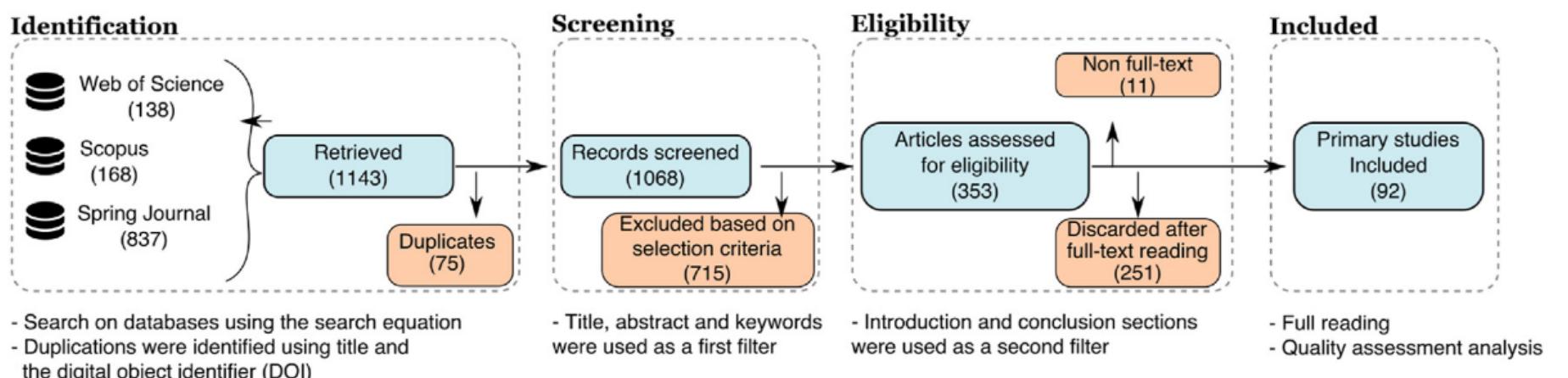
Grid lecture

Literature review: Conducting

Table 1

Systematic review protocol for the literature.

Stage	Principle	Description
Search Strategy	Type of studies	Journal papers and conference proceedings.
	Keywords	<ul style="list-style-type: none"> ● "3D Printing", "additive manufacturing" ● Recycling ● "Plastic", "Polymer", "Thermoplastic"
	Search equation	(3D printing OR additive manufacturing) AND Recycl* AND ("Plastic" OR "Polymer" OR "Thermoplastic")
	Period of time	2009–June 2019
Study selection	Databases	Scopus, Springer, Web of Science
	Criteria	<ol style="list-style-type: none"> 1) Articles related to the use of recycled thermoplastic for AM technology 2) Studies should be focused on engineering, material or process design.
	Procedure	<ol style="list-style-type: none"> 1) Title, abstract and keywords are screened 2) Introduction section and conclusions were read 3) Full article was reviewed 4) Selection is made on the quality assessment
Data extraction	Closing the loop	<ul style="list-style-type: none"> ● Source of the plastic waste ● Parameter used as quality indicator before printing ● Application intended for the recycled printed part ● Characterization test for raw, or 3D feed stock or recycled printed part
Quality assessment	Technical test	Is the study related to the phases I, II, III, IV, V or VI?
	QA 1	Is a recycling methodology presented in the experiment?
	QA 2	Does the study present implications of plastic recycling on AM technology?

**Fig. 5.** Systematic literature review methodology. Adapted from the PRISMA principles (Moher et al., 2009; Siddaway et al., 2019).

Literature review: Reporting

Table A.1
Primary studies considered in the literature review

Author	Year	Category Recycled.Material	Closing the loop			Raw	Feedstock	Printed part	Sust. dimensions					
			Source	Feedstock quality	Application				SM	FP	LMWC	SM	FP	LMWC
Recovery														
Pavlo et al. (2018)	2018 I							X		X		X	X	X
Hart et al. (2018)	2018 I	MRE meal bags	Military (Meal Ready to Eat)	Diameter	Military			X		X		X	X	X
Czyżewski et al. (2018)	2018 I, III	ABS	E-waste							X		X		
Gaikwad et al. (2018)	2018 I, III, VI	E-Waste,ABS	E-waste					X		X		X		X
Preparation														
Hunt et al. (2015)	2015 II											X		X
Woern and Pearce (2018)	2018 II						Size Distribution					X		
Reddy and Raju (2018)	2018 II											X		
Romero-Alva et al. (2018)	2018 II											X		
Compounding														
Cruz et al. (2015)	2015 III	PLA						X	X	X	X	X		
Singh et al. (2016)	2016 III	Nylon-6								X		X		
Boparai et al. (2016)	2016 III	Nylon6							X	X		X		
Mohammed et al. (2017)	2017 III	ABS,HDPE		Diameter							X	X		
Woern and Pearce (2017)	2017 III												X	X
Anderson (2017)	2017 III	PLA										X		X
Chong et al. (2017)	2017 III	HDPE								X	X			
Cruz Sanchez et al. (2017)	2017 III	PLA							X		X	X	X	
Hu et al. (2017)	2017 III	PLBSI,PLA							X	X	X	X	X	X
Girdis et al. (2017)	2017 III	Macadamia nutshell							X		X	X		
Veer et al. (2017)	2017 III	PP									X	X		
Kucherov et al. (2017)	2017 III										X	X		
A. K. Singh et al. (2018)c	2018 III	HDPE							X				X	
Dunnigan et al. (2018)	2018 III	Polylite® ,Nylon								X	X		X	
Xu et al. (2018)	2018 III	Chitosan									X		X	X
Cicala et al. (2018)	2018 III	SuperSap epoxy monomers CLX(S)								X		X	X	
N. Singh et al. (2018b)	2018 III	LDPE								X		X	X	X
Zander et al. (2018)	2018 III	PET	Bottles and Packaging						X	X	X	X	X	X
Tian et al. (2017)	2018 III	PLA,carbon fiber								X		X	X	X
N. Singh et al. (2018a)	2018 III	HDPE							X	X		X	X	X
Zhang et al. (2018)	2018 III	2-hydroxy-3-							X		X		X	

F.A. Cruz Sanchez et al. / Journal of Cleaner Production 264 (2020) 121602

Structure of Literature

- Title
- Abstract
- Introduction
- Literature review
- Methodology
- Results
- Discussion
- Conclusion
- References

Example 1:

<https://doi.org/10.1016/j.jclepro.2020.121602>


Contents lists available at [ScienceDirect](#)

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro



Review

Plastic recycling in additive manufacturing: A systematic literature review and opportunities for the circular economy

Fabio A. Cruz Sanchez ^{a,*}, Hakim Boudaoud ^a, Mauricio Camargo ^a, Joshua M. Pearce ^b

^a Université de Lorraine, Équipe de Recherche sur les Processus Innovatifs, ERPI, F-54000, Nancy, France

^b Department of Materials Science & Engineering, Department of Electrical & Computer Engineering, Michigan Technological University, Houghton, MI, 49931-1295, USA

ARTICLE INFO

Article history:
 Received 16 September 2019
 Received in revised form
 20 March 2020
 Accepted 8 April 2020
 Available online 15 April 2020

Handling editor: Prof. Jiri Jaromir Klemeš

Keywords:
 Distributed recycling
 Plastic recycling
 Additive manufacturing
 3D printing
 Circular economy

ABSTRACT

The rapid technical evolution of additive manufacturing (AM) enables a new path to a circular economy using distributed recycling and production. This concept of Distributed Recycling via Additive Manufacturing (DRAM) is related to the use of recycled materials by means of mechanical recycling process in the 3D printing process chain. This paper aims to examine the current advances on thermoplastic recycling processes via additive manufacturing technologies. After proposing a closed recycling global chain for DRAM, a systematic literature review including 92 papers from 2009 to 2019 was performed using the scopus, web of science and springer databases. This work examines main topics from six stages (recovery, preparation, compounding, feedstock, printing, quality) of the proposed DRAM chain. The results suggested that few works have been done for the recovery and preparation stages, while a great progress has already been done for the other stages in order to validate the technical feasibility, environmental impact, and economic viability. Potential research paths in the pre-treatment of recycled material at local level and printing chain phases were identified in order to connect the development of DRAM with the circular economy ambition at micro, meso and macro level. The development of each stage proposed using the open source approach is a relevant path to scale DRAM to reach the full technical potential as a centerpiece of the circular economy.

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* Corresponding author.
 E-mail address: cruzsancl@univ-lorraine.fr (F.A. Cruz Sanchez).

<https://doi.org/10.1016/j.jclepro.2020.121602>
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Literature review – Ethics

Report on your literature findings and beware of:

- Purposely misrepresenting the work of other authors.

Plagiarism – the use of another's original words, arguments, or ideas as though they were your own, even if this is done in good faith, out of carelessness, or out of ignorance.

- Importance of the References .bg-yellow[(Act 03 we'll take a look)]

Questions

Presentation