

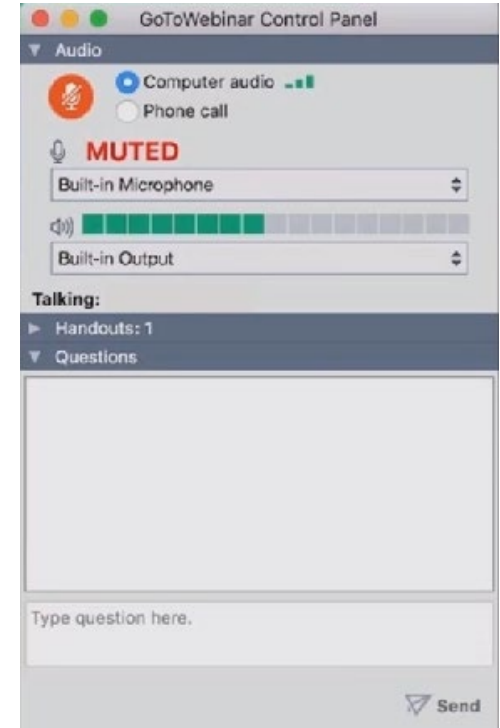
# Augmented Reality Through the Lens of the IP Landscape

*Michael E. Adel*  
*Anne Le Turnier*



# Housekeeping

- This webinar is being recorded, you will receive a link to access it, in a follow-up e-mail.
- If you have questions during the presentation, please send us via the Question Tab
- You can download the slides from the system
- At the end, you will get 4 short survey questions



# Augmented Reality Through the Lens of the IP Landscape

Today's speakers



**Michael E. Adel**  
Vice President of Intellectual  
Property, Lumus



**Anne Le Turnier**  
Director Business  
Development, LexisNexis IP

# Acknowledgments

- I would like to thank:
  - Dr. Sarbani Chattopadhyay of PatentSight for excellent application support.
  - Mike Pellegrino of IP Analytix for insightful discussions.

# Agenda

- The narrative
- Where are we in the metaverse?
- Augmented Reality vs Augmented Reality Optics
- Patent landscape analysis
  - Time evolution, filing rates
  - Bubble charts
  - Rankings and distributions, Pareto & Zipf
  - Jurisdictions
- Summary

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# The narrative

It's not just about the data, patent analytics must tell a story.

**“For sale: baby shoes, never worn.”**

Ernest Hemingway

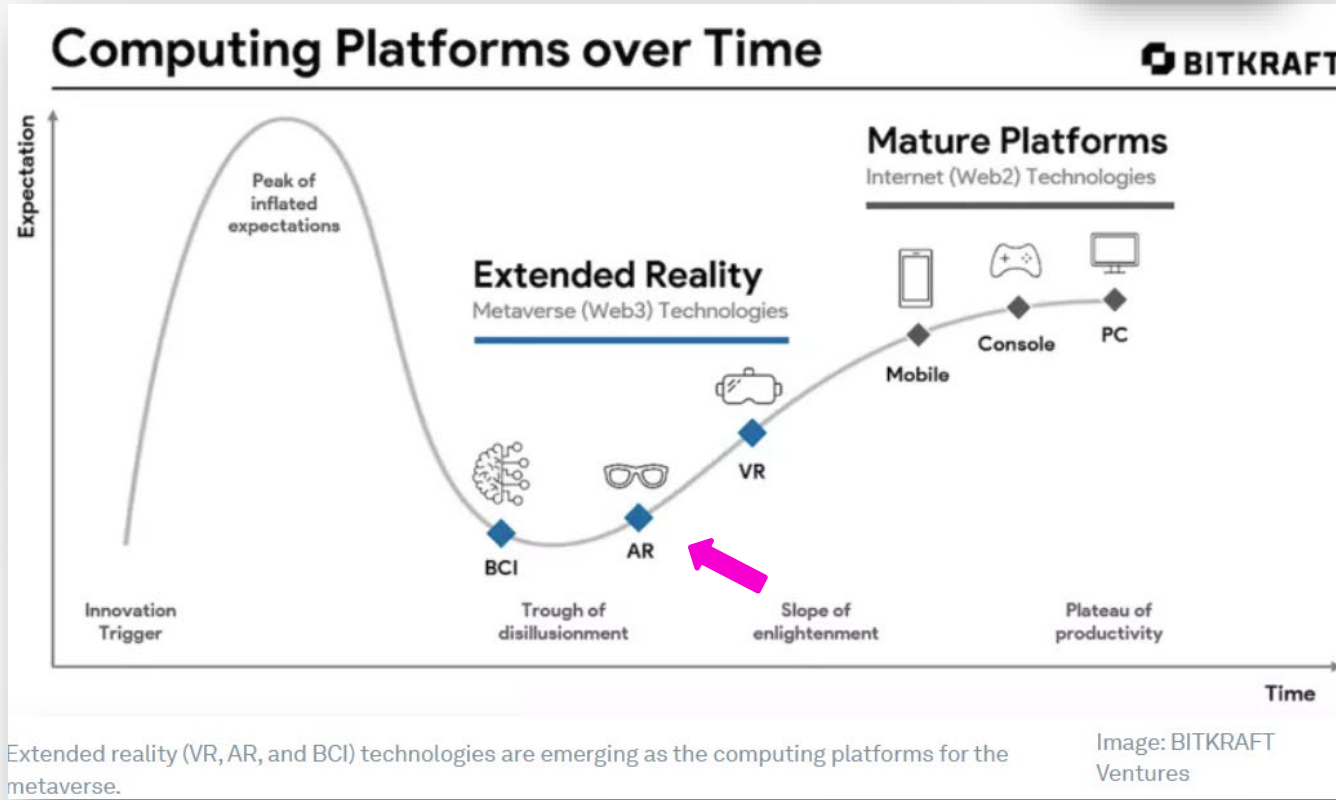


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# Where are we in the metaverse?



Extended reality (VR, AR, and BCI) technologies are emerging as the computing platforms for the metaverse.

<https://www.weforum.org/agenda/2022/02/future-of-the-metaverse-vr-ar-and-brain-computer/>

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# A tale of two landscapes

## Augmented Reality:



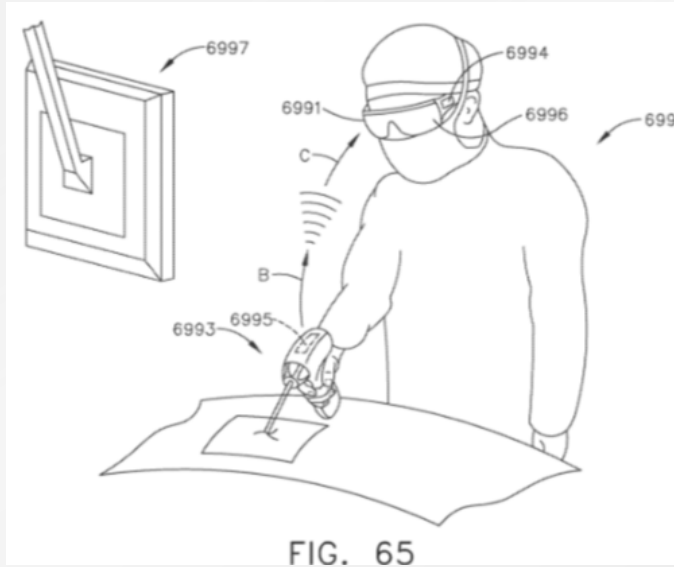
## Augmented Reality Optics:



# AR examples:

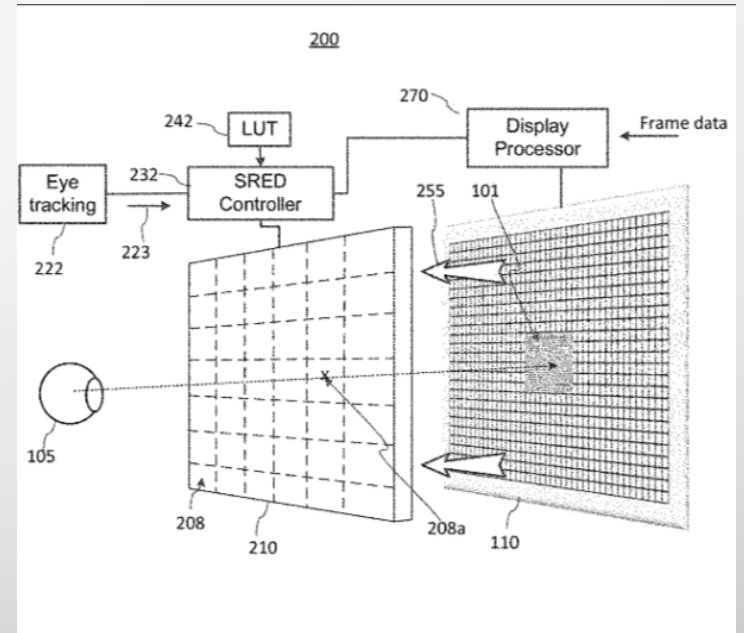
Johnson & Johnson: US11026751.B2

Display of alignment of staple cartridge to prior linear staple line.



Meta: US10636340.B2

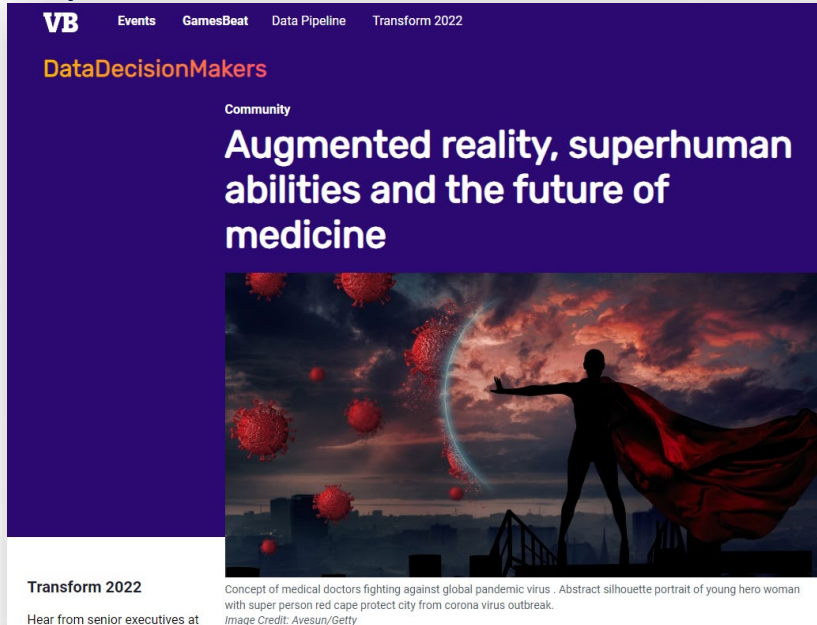
Display with gaze-adaptive resolution enhancement.



# AR examples:

Johnson & Johnson: US11026751.B2

Display of alignment of staple cartridge to prior linear staple line.



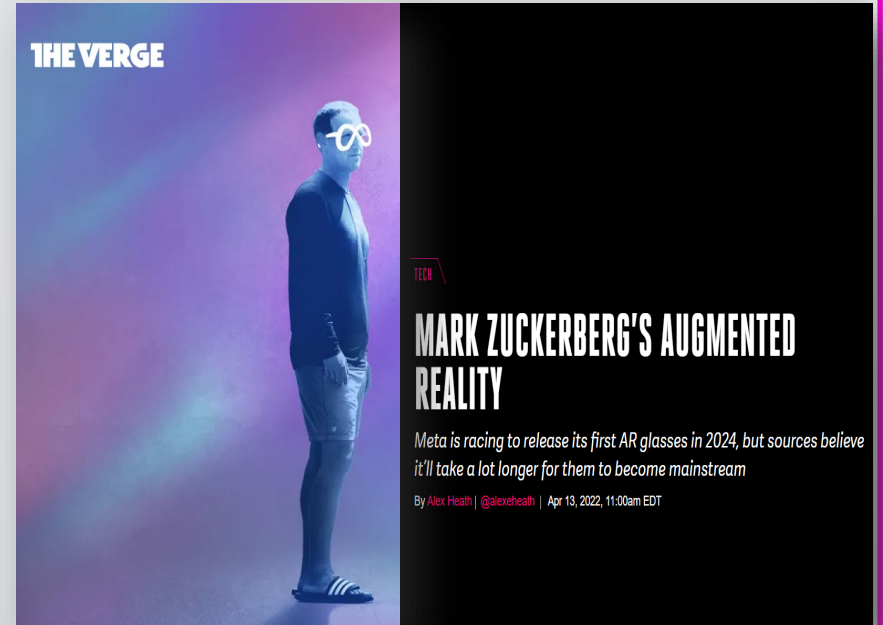
The screenshot shows a news article on the VentureBeat website. The header includes the 'VB' logo and navigation links for 'Events', 'GamesBeat', 'Data Pipeline', and 'Transform 2022'. The article title is 'Augmented reality, superhuman abilities and the future of medicine' under the 'DataDecisionMakers' section. The image depicts a superhero silhouette with a red cape standing on a rooftop, with a city skyline and a large, glowing red virus particle in the background. Below the image, there is a caption: 'Concept of medical doctors fighting against global pandemic virus - Abstract silhouette portrait of young hero woman with super person red cape protect city from corona virus outbreak. Image Credit: Avesun/Getty'.

**Transform 2022**  
Hear from senior executives at

Concept of medical doctors fighting against global pandemic virus - Abstract silhouette portrait of young hero woman with super person red cape protect city from corona virus outbreak.  
Image Credit: Avesun/Getty

Meta: US10636340.B2

Display with gaze-adaptive resolution enhancement.



The screenshot shows a news article on The Verge website. The header includes the 'THE VERGE' logo. The article title is 'MARK ZUCKERBERG'S AUGMENTED REALITY' under the 'TECH' section. The image depicts a man wearing AR glasses, standing in a futuristic, glowing environment. Below the image, there is a caption: 'Meta is racing to release its first AR glasses in 2024, but sources believe it'll take a lot longer for them to become mainstream'.

**THE VERGE**

**MARK ZUCKERBERG'S AUGMENTED REALITY**

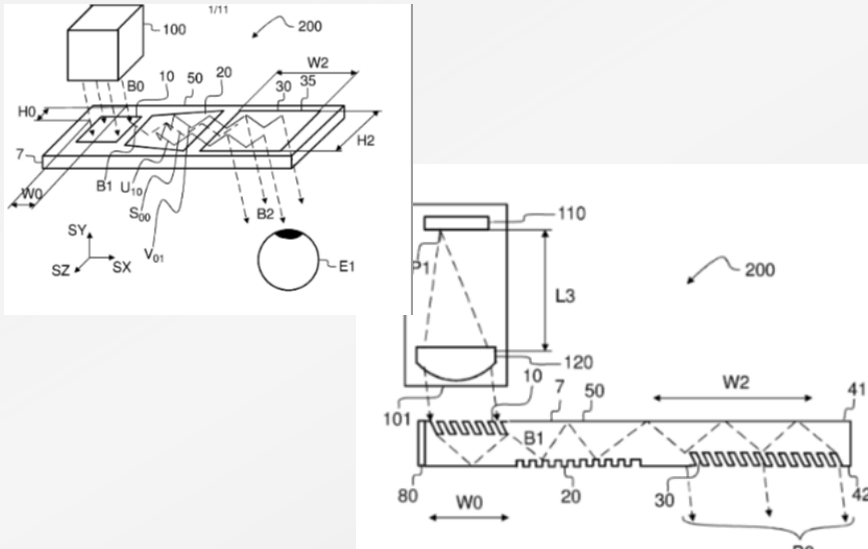
Meta is racing to release its first AR glasses in 2024, but sources believe it'll take a lot longer for them to become mainstream

By Alex Heath | @alexheath | Apr 13, 2022, 11:00am EDT

# AR Optics examples:

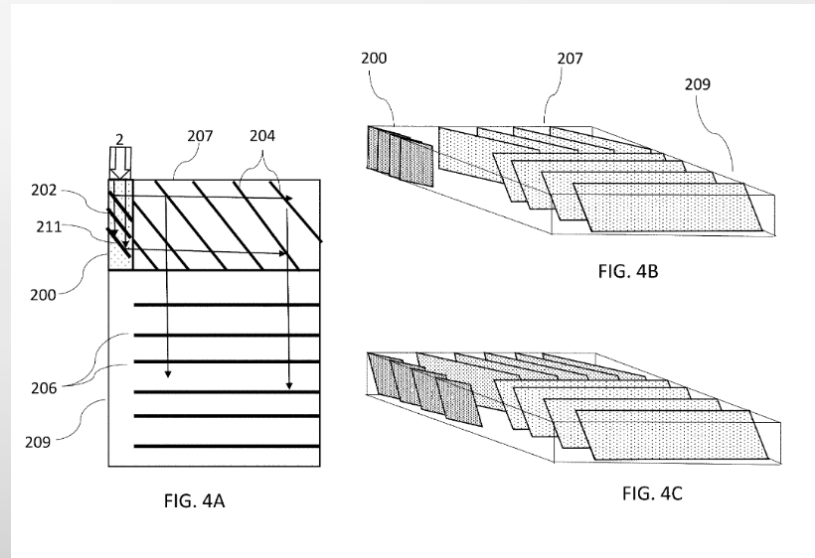
**Magic Leap: US8160411.B2**

**Device for expanding an exit pupil in two dimensions**



**Lumus: US10983264 B2**

**Optical systems including light-guide optical elements with two-dimensional expansion**



# AR Optics examples:

HANDS-ON / TECH / AUGMENTED REALITY


**THE VERGE**

## The Magic Leap 2 isn't a revolution, but it's a visible improvement

*A step toward fixing AR's most annoying limits*

By [Adi Robertson](#) | [@thedextriarchy](#) | Mar 10, 2022, 9:00am EST

f t SHARE



A photograph of a man wearing Magic Leap 2 AR glasses and a grey face mask. The glasses have a light blue frame and black lenses. The man is looking slightly to the right. The background is a plain, light-colored wall.

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News in Focus Business & Money Science & Tech Lifestyle & Health Policy & Public Interest People & Culture

06 Apr, 2022, 22:00 IDT

## Spurred by Customer Demand, Lumus Announces Two New Products Based on Unique 2D Reflective Waveguide Architecture

Lumus 2D Reflective Waveguides  
from David Goldman



Less than 1% waveguide glow

A photograph of a man wearing Lumus AR glasses. The glasses have a blue frame and clear lenses. The man is looking slightly to the right. The background is a blurred indoor setting.

# AR Optics examples:

The screenshot shows the Crunchbase profile for Magic Leap. The header includes the Crunchbase logo, a search bar, and a 'START FREE TRIAL' button. The profile name 'Magic Leap' is prominently displayed. Below the name are tabs for 'Summary', 'Financials', 'People', 'Technology', and 'Sign'. The 'About' section describes Magic Leap as a proprietary wearable technology. The 'Highlights' section features a grid of statistics: Acquisitions (7), Investments (3), Total Funding Amount (\$3.5B), Contacts (565), Employee Profiles (36), and Investors (28). A photo of a person wearing a grey AR headset is shown at the bottom.

crunchbase Search Crunchbase Advanced START FREE TRIAL

ORGANIZATION  
**Magic Leap**

Summary Financials People Technology Sign

**About**

Magic Leap is a proprietary wearable technology that enables users to interact with digital devices in a completely visually cinematic way.

Plantation, Florida, United States  
1001-5000  
Venture - Series Unknown  
Private  
magicleap.com  
11,164

**Highlights**

Acquisitions 7	Investments 3
Total Funding Amount \$3.5B	Contacts 565
Employee Profiles 36	Investors 28

41  
42

The screenshot shows the Crunchbase profile for Lumus. The header includes the Crunchbase logo, a search bar, and a 'START FREE TRIAL' button. The profile name 'Lumus' is prominently displayed. Below the name are tabs for 'Summary', 'Financials', 'People', 'Technology', and 'Sign'. The 'About' section describes Lumus as enabling users to view video and data content by wearing the LOE technology-based see-through wearable displays. The 'Highlights' section features a grid of statistics: Total Funding Amount (\$57M), Contacts (2), Employee Profiles (10), Investors (8), and Similar Companies (9). A photo of a person wearing a dark AR headset is shown at the bottom.

crunchbase Search Crunchbase Advanced START FREE TRIAL

ORGANIZATION  
**Lumus**

Summary Financials People Technology Sign

**About**

Lumus enables users to view video and data content by wearing the LOE technology-based see-through wearable displays.

Rehovot, HaMerkaz, Israel  
51-100  
Series C  
Private  
www.lumusvision.com  
17,409  
Actively Hiring - View All Jobs

**Highlights**

Total Funding Amount \$57M	Contacts 2
Employee Profiles 10	Investors 8
Similar Companies 9	





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# Search criteria:

## AR

(( ( IPC=(G06F 111/18) OR  
CPCOriginal=(G06F2111/18) ) AND  
TitleAbstractClaims=(augmented\* ) OR  
CPCOriginal=(A61B2019/5291, A61B2090/365,  
B60K2370/177, G02B 27/01, G05B2219/32014,  
G05B2219/39451, G06K 9/00671, H04M2203/359,  
H04N2201/3245) OR IPC=(G02B 27/01) OR  
TitleAbstractClaims=((augmented, mixed) NEAR  
(realit\*))

## AR Optics

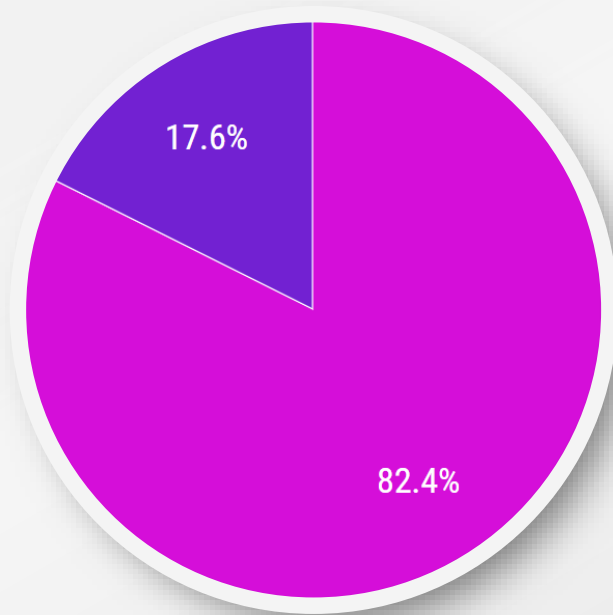
( CPC=(G02B 27/01) OR IPC=(G02B 27/01) ) AND  
TitleAbstractClaims=(optical device or waveguide or  
lightguide or wave guide or light guide)

CPC/IPC G02B 27/01 = head-up display

# Pie chart of AR Optics in AR

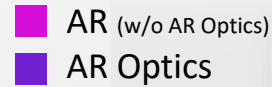
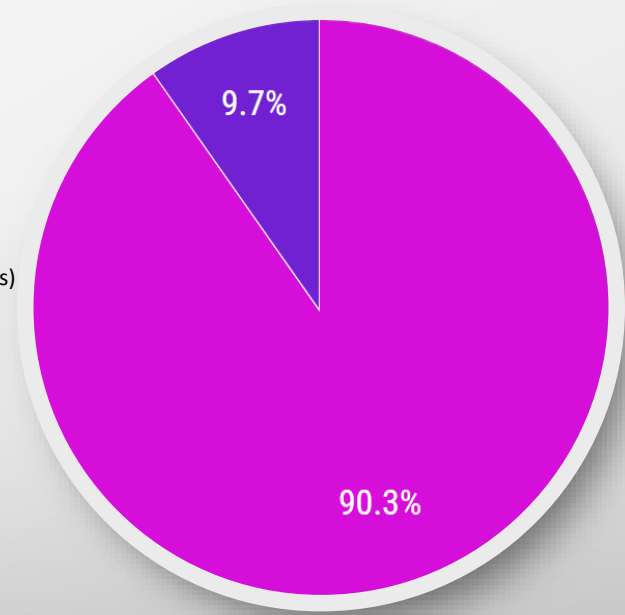
## Patent Asset Index™

- Pie chart of proportion of AR Optics in AR



## Portfolio size

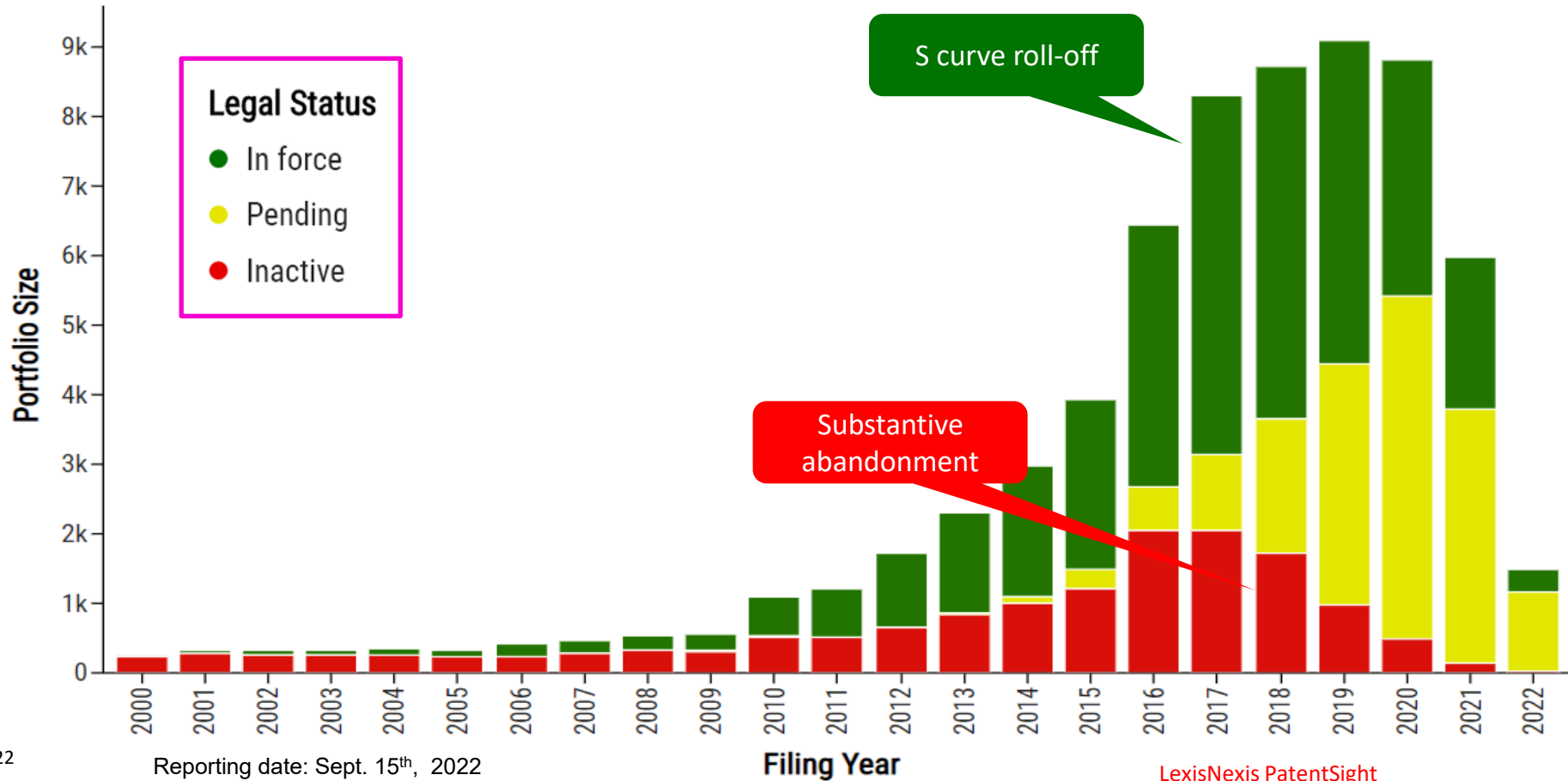
- Pie chart of proportion of AR Optics in AR



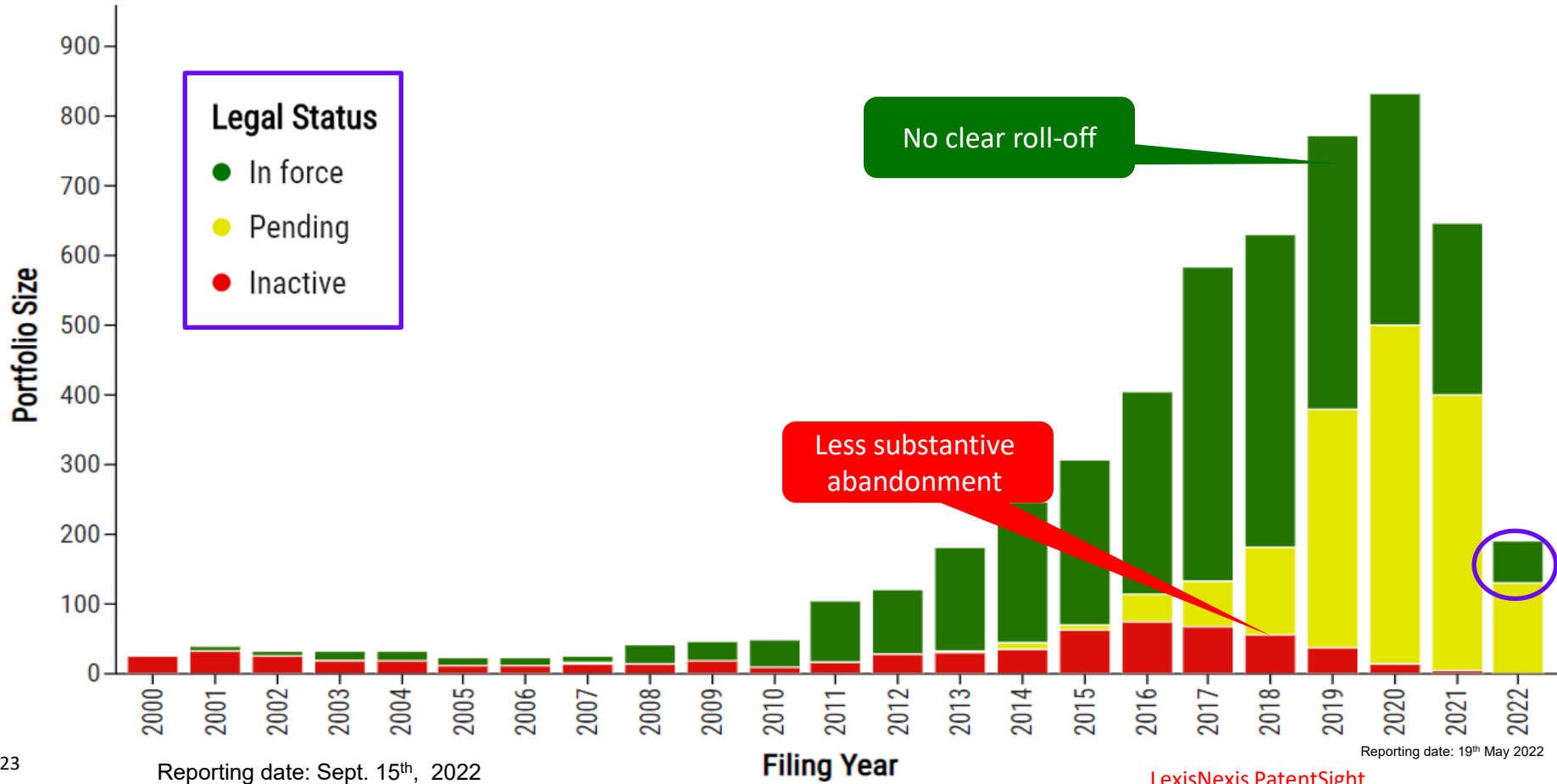
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# AR patent landscape filing stats by current legal status

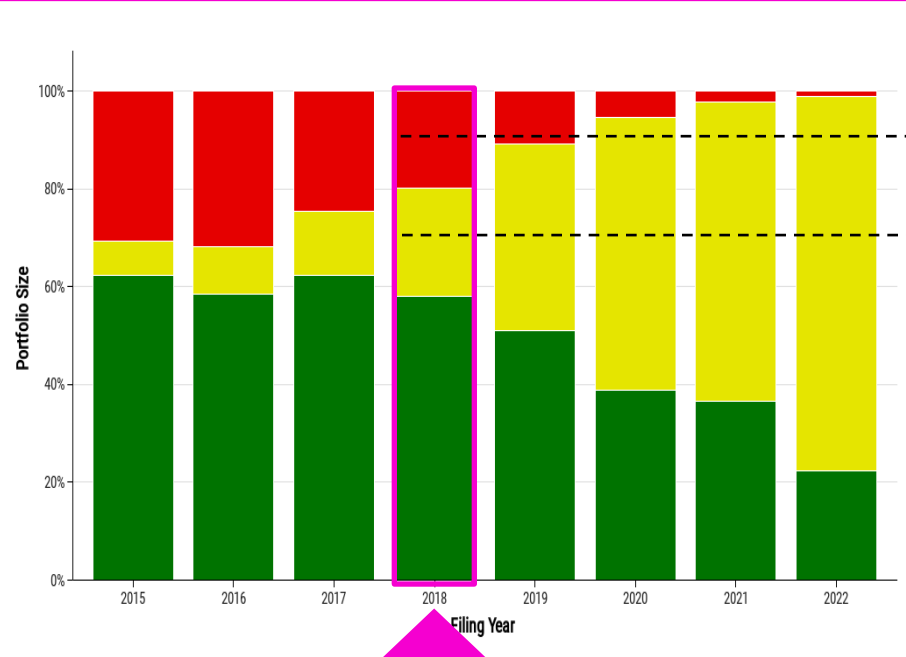


# AR Optics patent landscape filing stats by current legal status

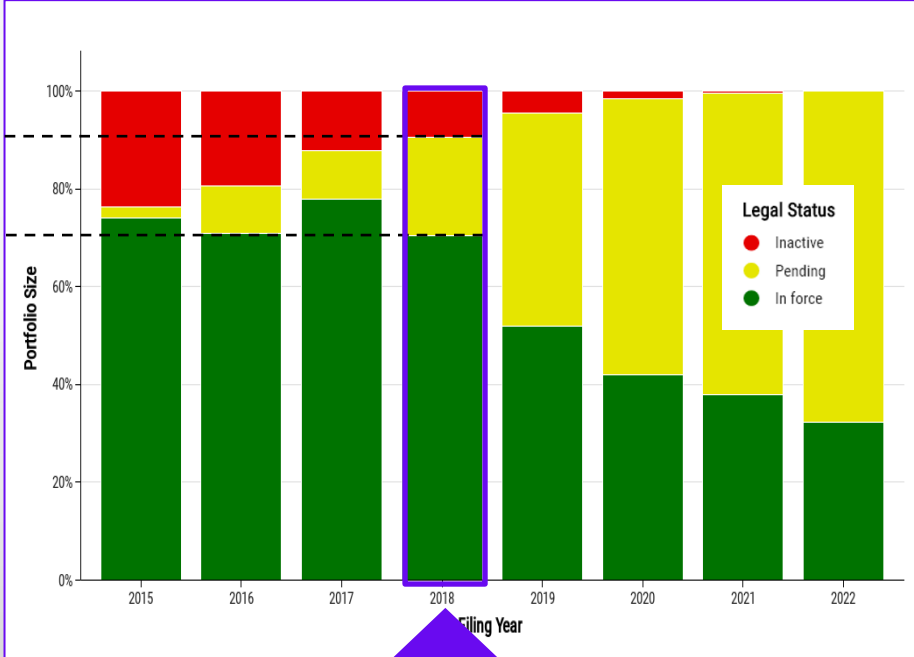


# AR indicates higher abandonment and lower allowance rates than AR Optics

## AR



## AR Optics



Reporting date: Sept. 15<sup>th</sup>, 2022



# USPTO rejection analysis, AR vs AR Optics

## AR

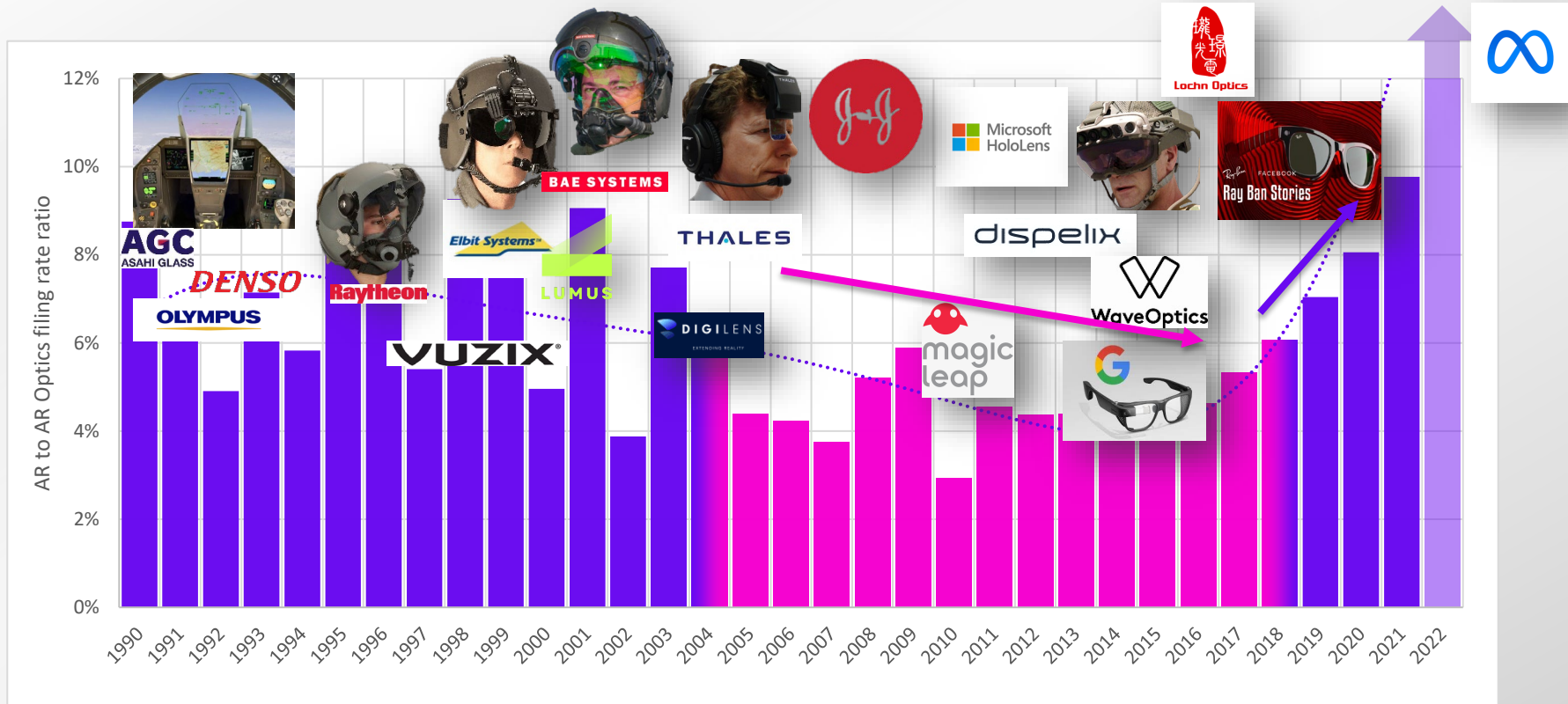
Rejection Type	Occurrence Per Application	Relative Performance	
Non-final Rejections	1.10	Average	
Final Rejections	0.55	Worse than average	
Total Rejections	1.65	Worse than average	
§101 Rejections	0.52	Poor	
§102 Rejections	0.84	Among the best	
§103 Rejections	10.46	Poor	
§112 Rejections	0.58	Better than average	

## AR Optics

Rejection Type	Occurrence Per Application	Relative Performance	
Non-final Rejections	0.96	Better than average	
Final Rejections	0.41	Average	
Total Rejections	1.37	Better than average	
§101 Rejections	0.05	Better than average	
§102 Rejections	0.99	Better than average	
§103 Rejections	9.08	Worse than average	
§112 Rejections	0.50	Among the best	

ASSIGNEEDASHBOARD

# The filing rate ratio between AR & AR optics tells the story



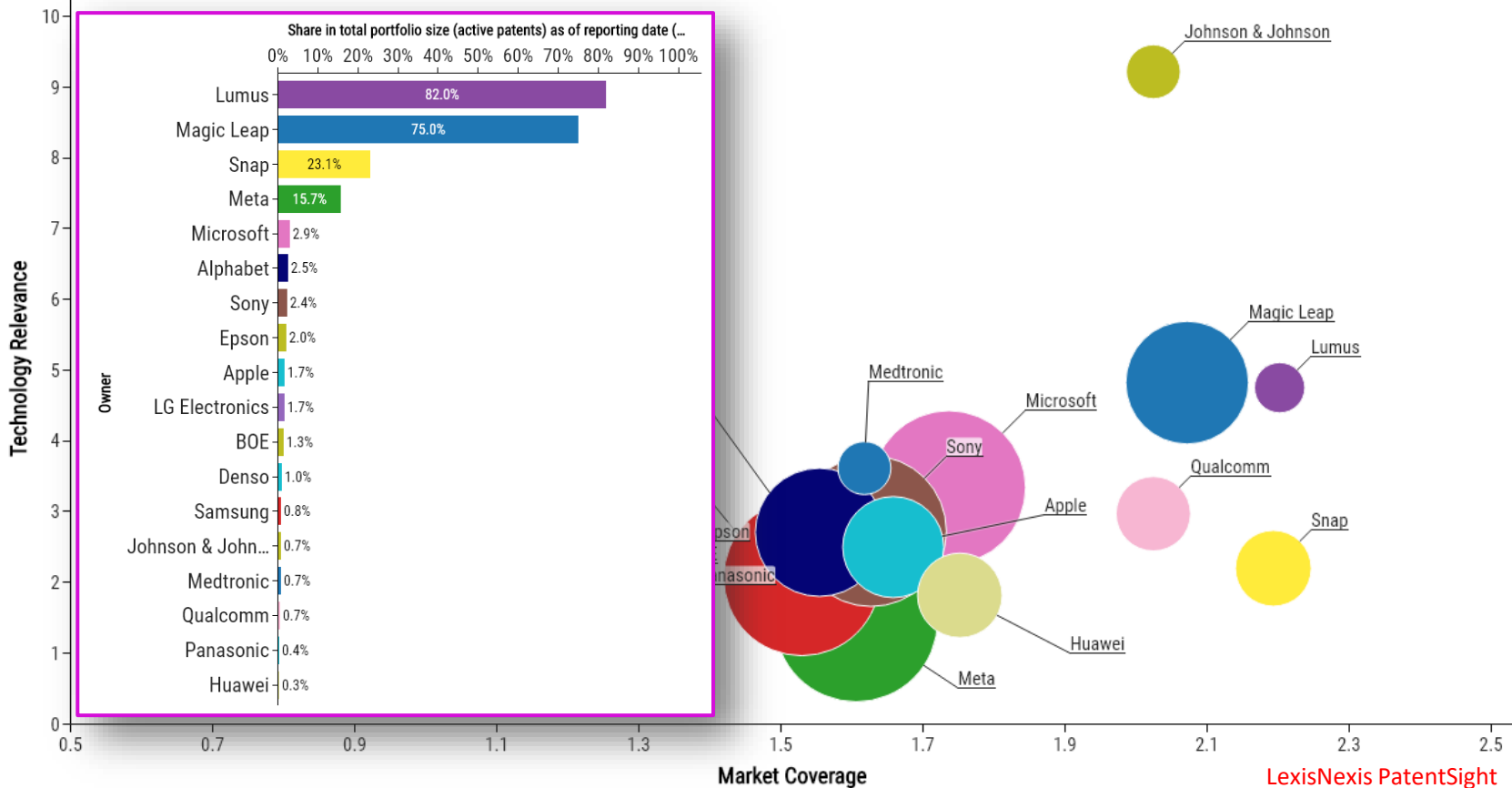
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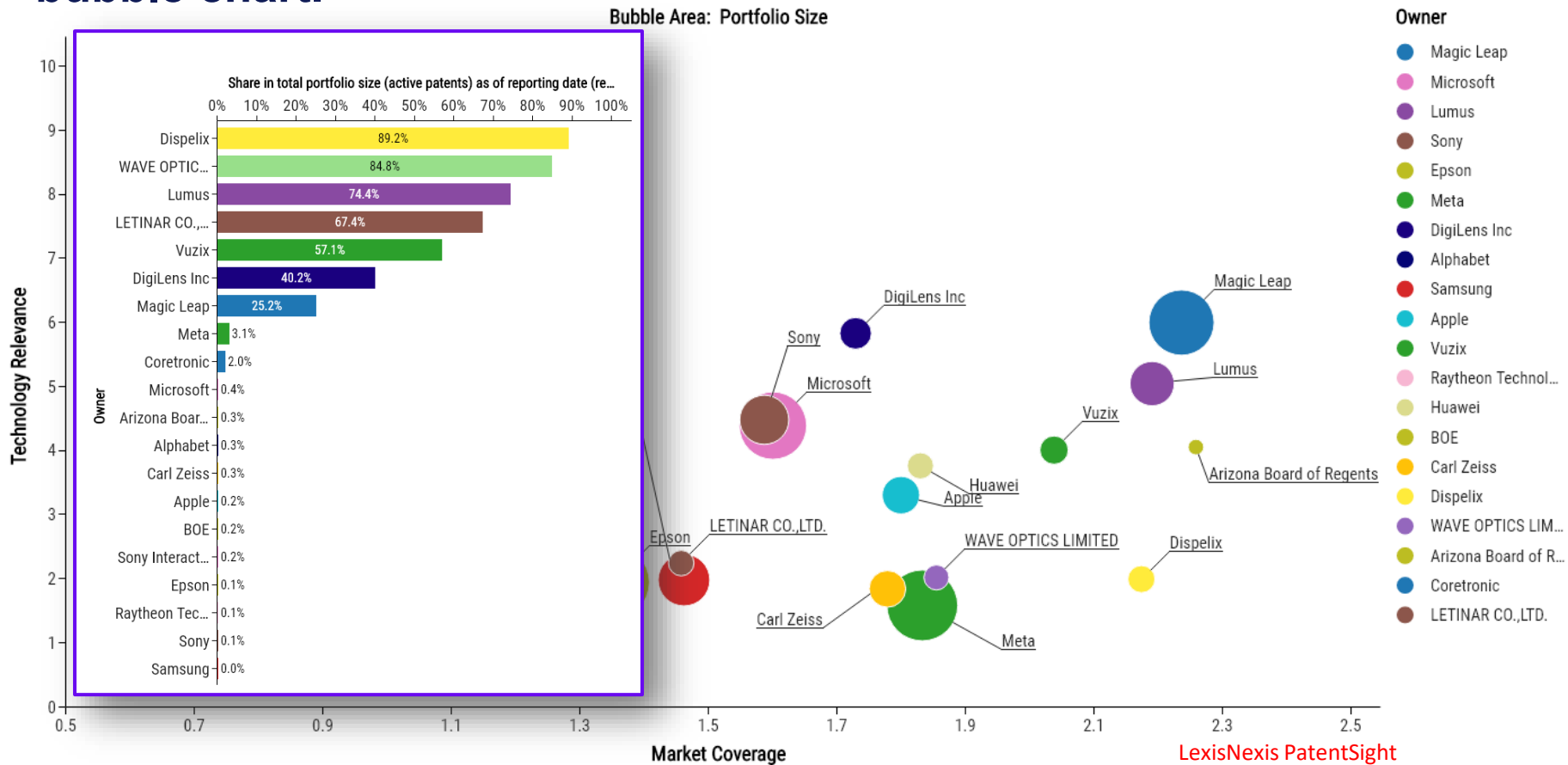
# The AR bubble chart shows a major player cluster and specialist outliers.

Bubble Area: Portfolio Size

Owner



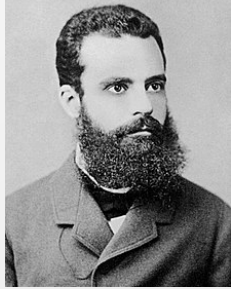
# Magic Leap, Lumus and Digilens stand out in the AR Optics bubble chart.



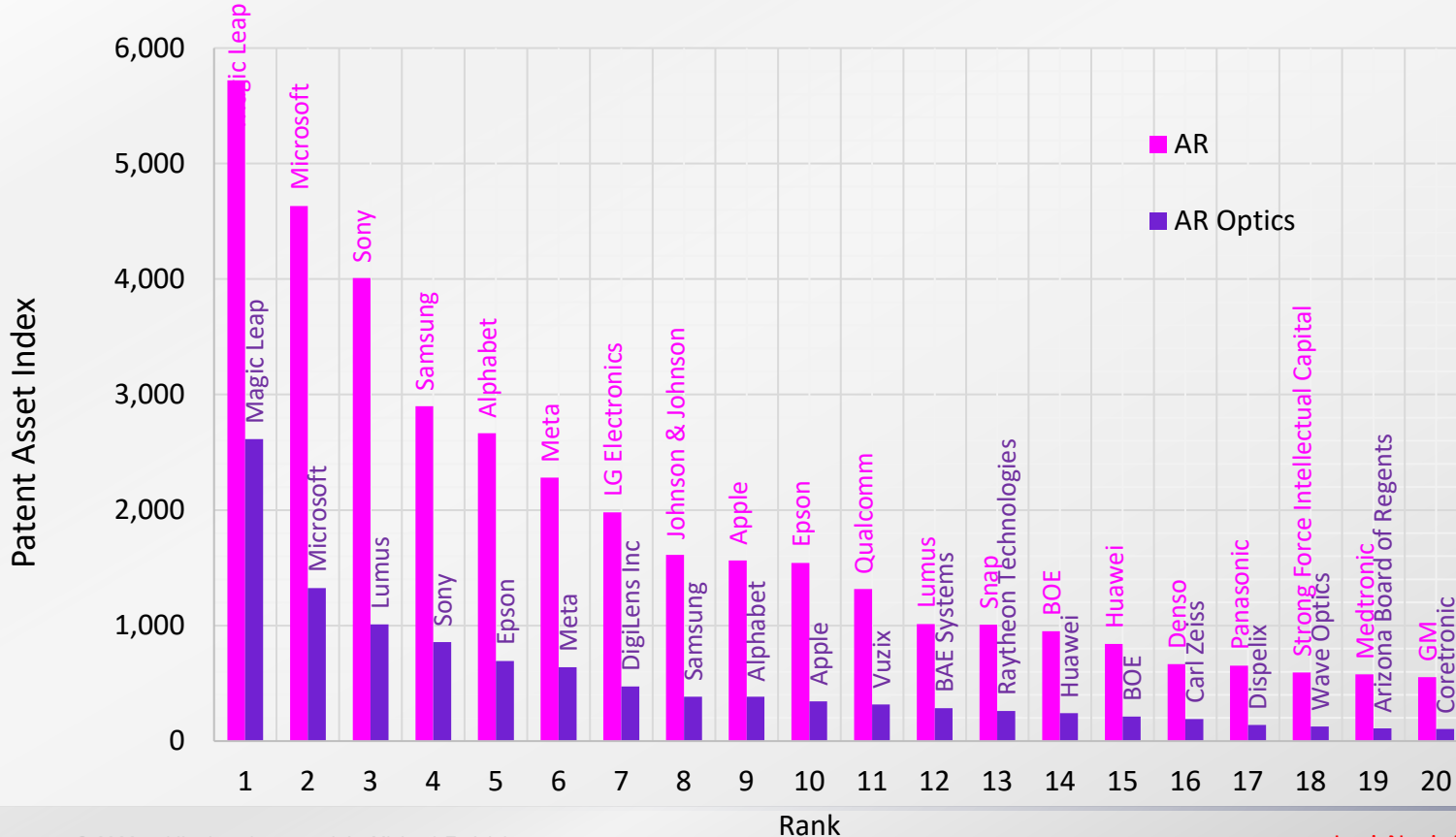
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# The AR Optics ranked Pareto decays more rapidly than AR.



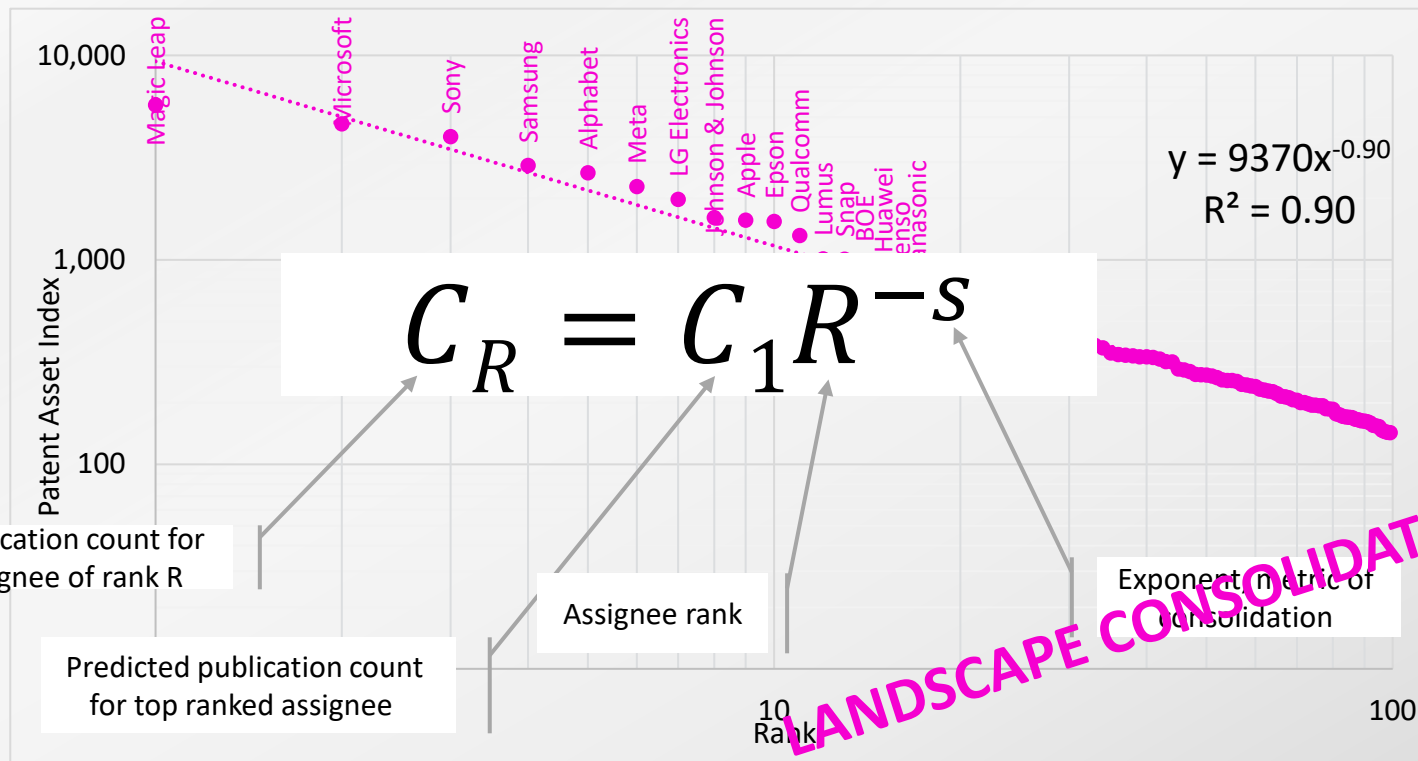
**Born** Wilfried Fritz Pareto  
 15 July 1848  
 Paris, France  
**Died** 19 August 1923  
 Céligny, Switzerland  
**Nationality** Italian  
**Institutions** University of Lausanne  
**Field** Economics



# A ranked Pareto on a log log plot is called a Zipf plot.

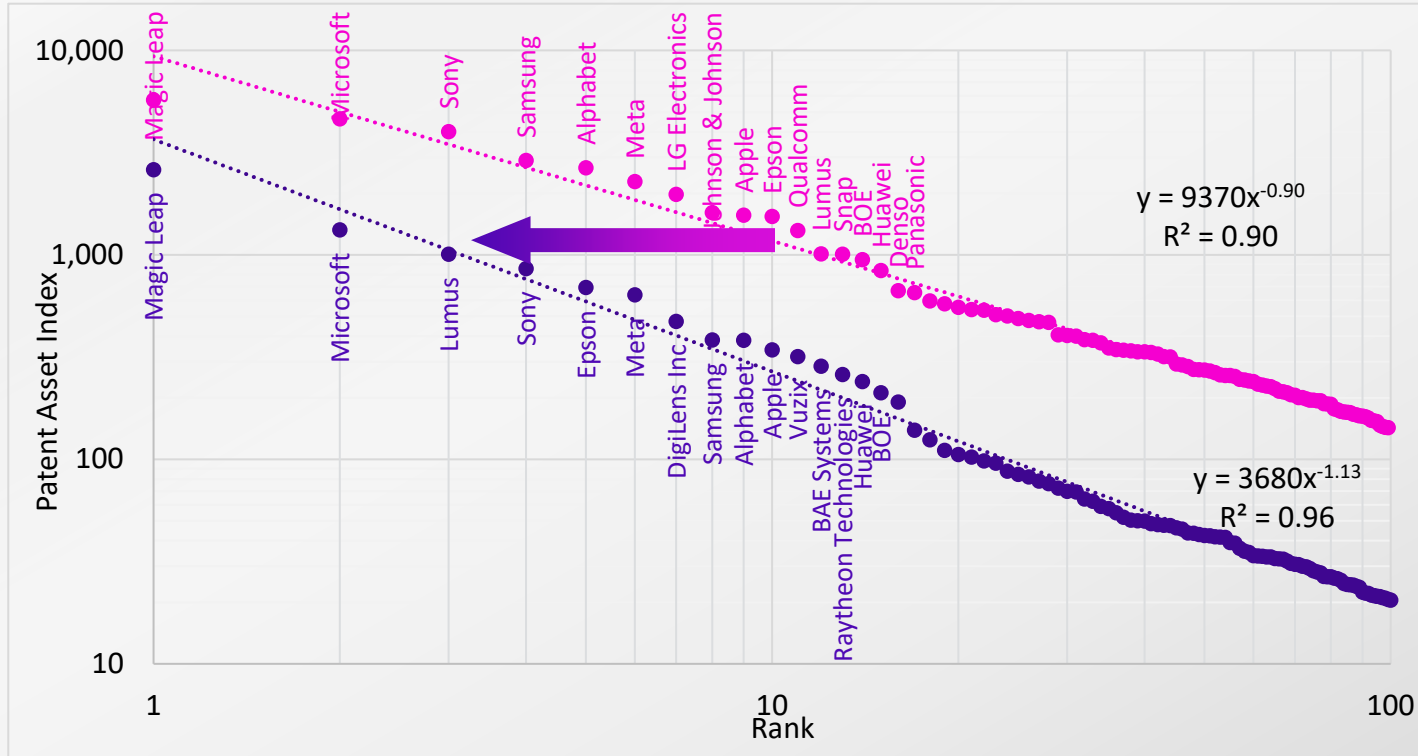


Born George Kingsley Zipf  
 January 7, 1902  
 Freeport, Illinois  
 Died September 25, 1950  
 Newton, Massachusetts  
 Nationality American  
 Alma mater Harvard College  
 Field Linguistics

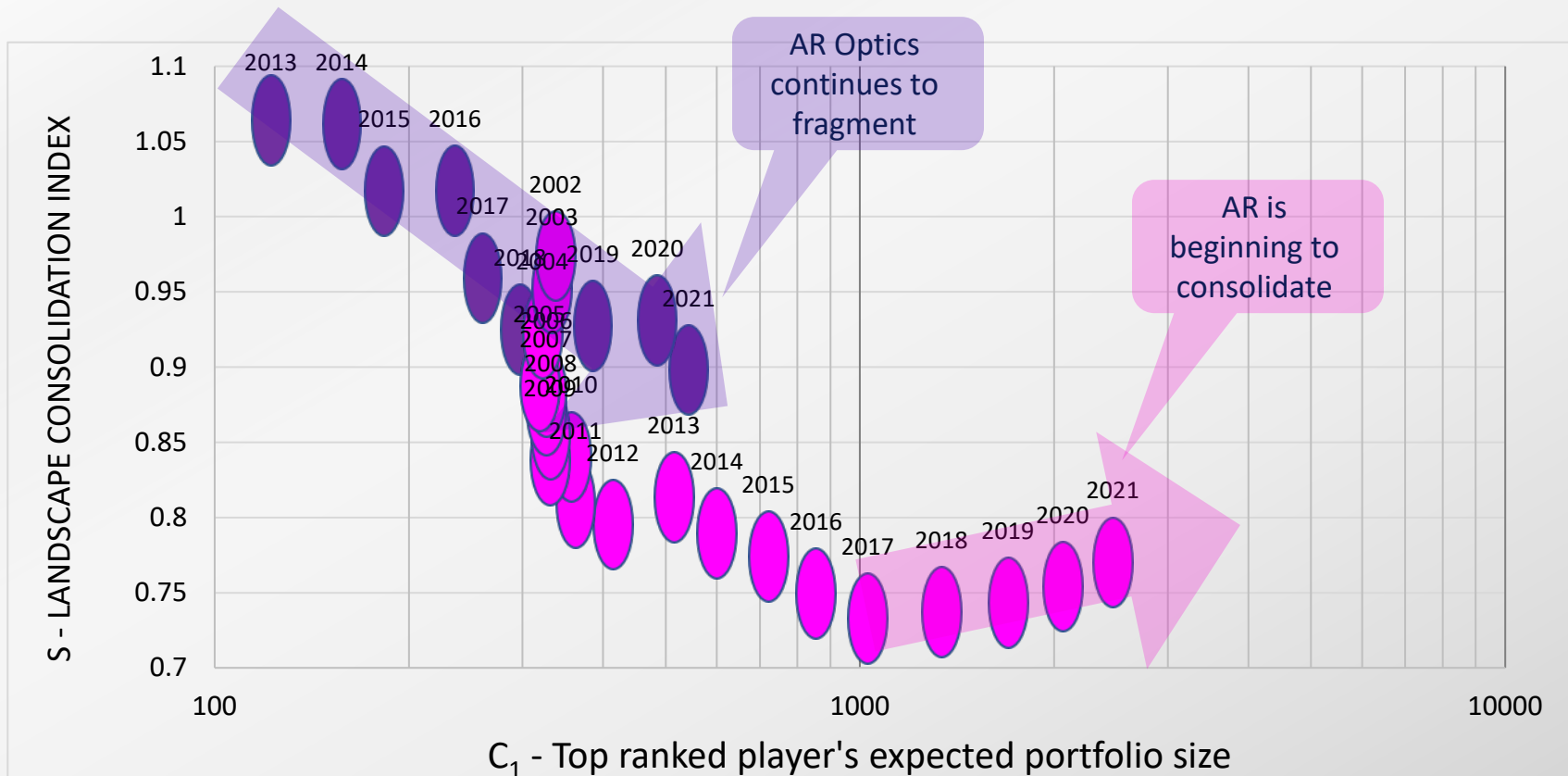




# Lumus moves from 12<sup>th</sup> to 3<sup>rd</sup> place in AR optics ranking



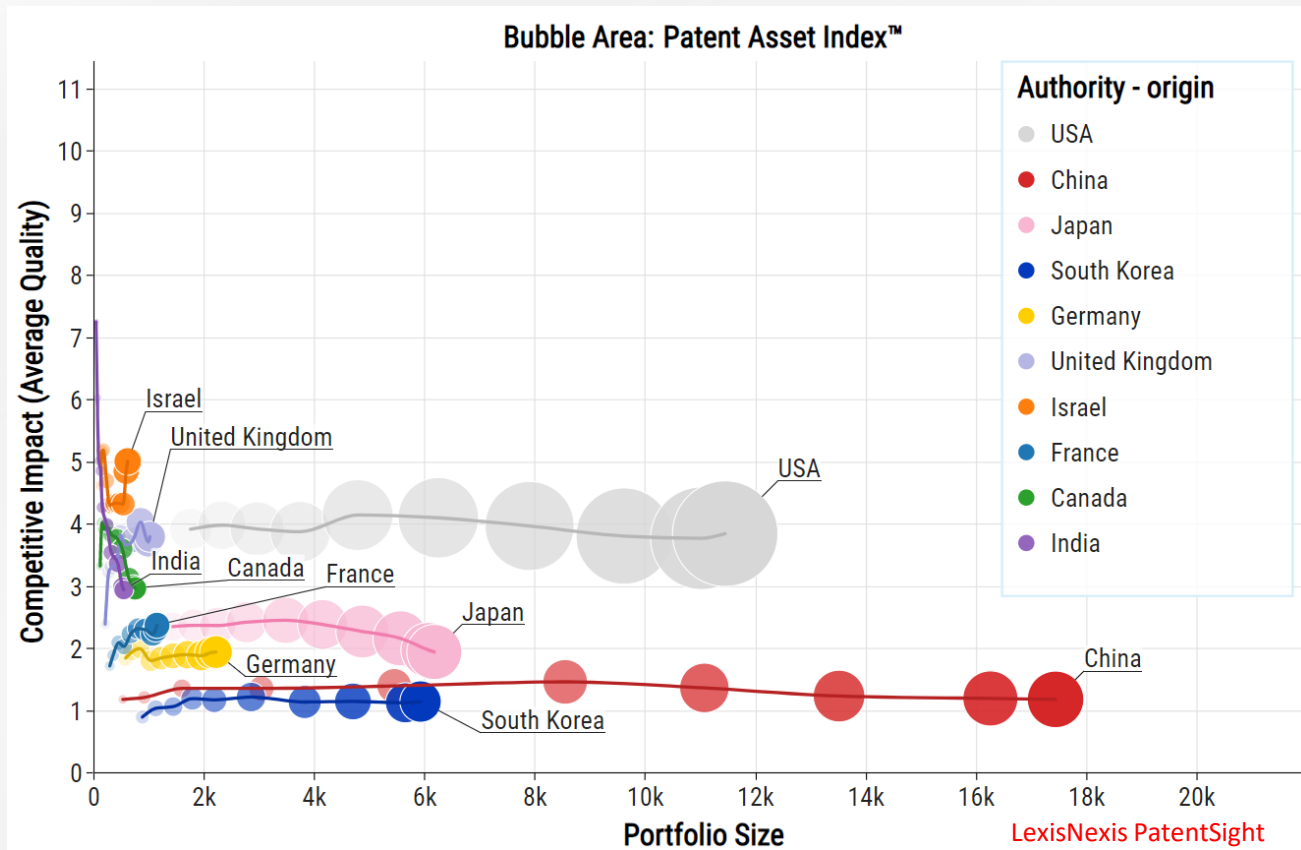
# While AR consolidates, the AR Optics portfolio fragments.



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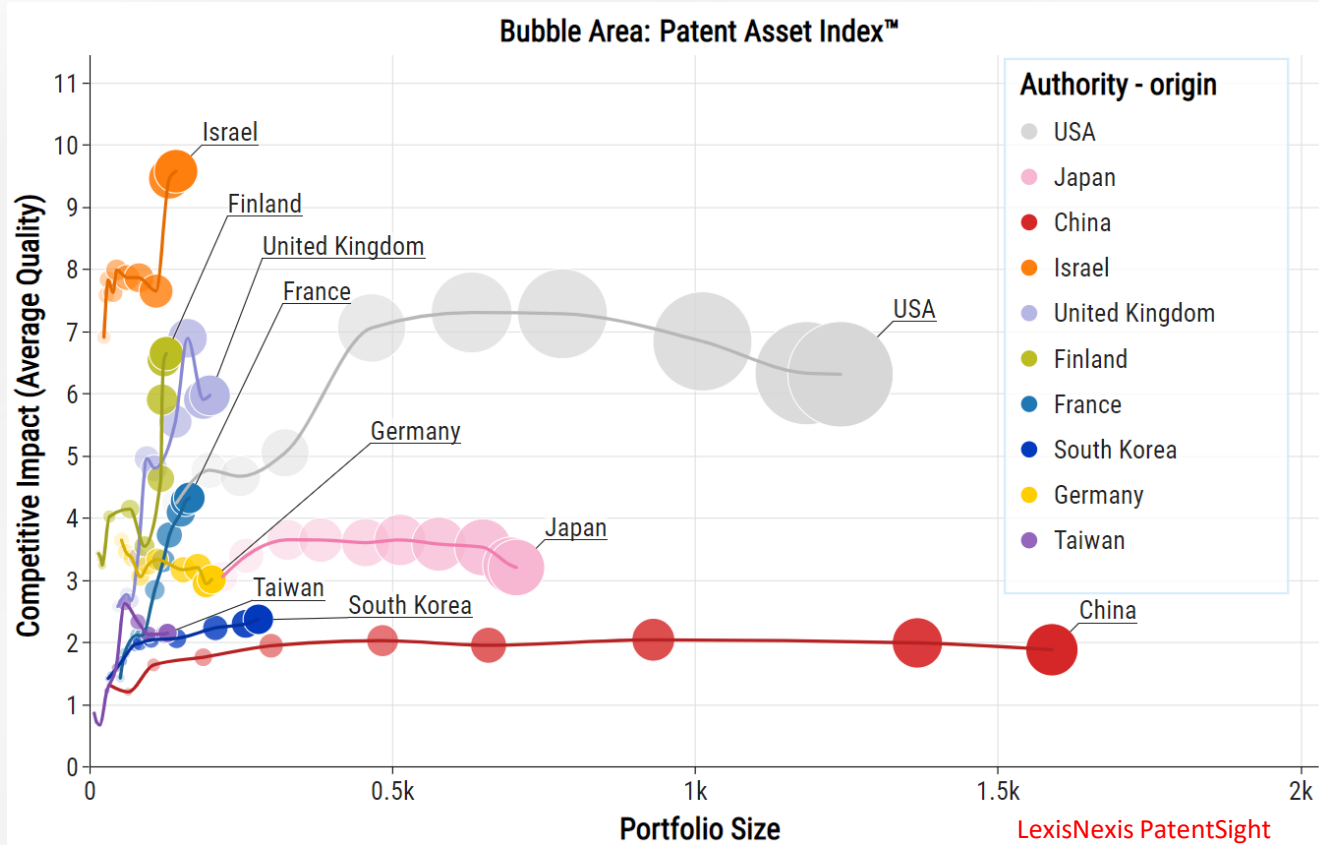
# AR by inventor origin



Average Quality vs Quantity of patent families with inventor address in corresponding authorities.

Ranking by Patent Asset Index of patent families.







# AR Optics by inventor origin



Average Quality vs Quantity of patent families with inventor address in corresponding authorities.

Ranking by Patent Asset Index of patent families

# Summary – key take aways

- Patent analytics has to ***tell a story***. 
- **AR** is crawling out of the ***trough of disillusionment***. 
- **AR optics** filings are ***growing faster*** than **AR**. 
- While the **AR** portfolio ***consolidates***, **AR optics** continues to ***fragment***. 
- Lumus ***punches above their weight*** in **AR**, & **AR optics** in particular. 
- **AR optics** is ***the rate limiting enabler*** for consumer **AR** products. 

Questions



# Thank you for your interest!



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[Connect on LinkedIn](#)



**Michael E. Adel**  
[madel@lumus-optical.com](mailto:madel@lumus-optical.com)

[Connect on LinkedIn](#)