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• **THEME:**

Technological innovations and challenges in the optical market

The new frontiers of optics

between technological revolution and market disruption

EXPERTS

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SESSION.03

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FOCUS SESSION #03

Smart Glasses:

A technological revolution in progress

Smart glasses are emerging as one of the most promising innovations in wearable technology and optics. These devices, at the intersection of engineering, miniaturization, and artificial intelligence, are positioned as potential successors to smartphones. Let's explore the technological and hardware advancements shaping these products, as well as the current state and future of Meta's Orion project.

1. Technological innovations for smart glasses

Augmented Reality (AR) and Mixed Reality (XR)

- **Immersive displays:** The integration of micro-projectors and transparent OLED screens enables the display of information directly in the user's field of view. These displays can overlay digital content, such as GPS directions, real-time translations, or notifications, onto the real world.

- **Spatial mapping and context awareness:** Advanced sensors (e.g., LiDAR, stereo cameras) allow smart glasses to create real-time maps of their surroundings, enabling precise interactions between digital content and the physical environment.

- **Contextual AI:** Artificial intelligence algorithms analyze user habits and context to anticipate needs. For example, they might suggest directions based on the user's schedule or display information about a building being observed.

Hands-free interactions

- **Voice commands:** Smart glasses integrate advanced voice assistants to control features, allowing users to interact without touching the device.

- **Intuitive gestures:** Some technologies experiment with sensors capable of recognizing gestures, such as a simple hand movement to scroll through notifications or interact with virtual elements.

Specific applications

- **Health and wellbeing:** Glasses can monitor biometric data (heart rate, physical activity) or offer solutions for visually impaired individuals, such as text magnification or automated reading of signs.

- **Collaboration and remote work :** AR-enabled smart glasses support virtual meetings and real-time collaboration on 3D projects.

2. Hardware innovations for smart glasses

Miniaturization of components

- **Dedicated microprocessors:** Chips designed specifically for AR, like Qualcomm's Snapdragon XR processors, deliver high performance with reduced energy consumption.

- **Optimized batteries:** Advances in lithium-ion batteries and energy management extend the autonomy of smart glasses while reducing weight. Some innovations explore flexible batteries integrated into the glasses' arms.

Advanced display technologies

- **Electrochromic lenses :** These lenses can automatically adjust their tint based on ambient light, combining the functions of sunglasses and AR displays.

- **Advanced micro-displays :** Micro-LEDs and holographic screens are being developed for brighter, clearer, and more energy-efficient displays.

Embedded sensors

- **LiDAR and stereo cameras:** These sensors provide better depth understanding and enable more accurate interactions with the environment.

- **Directional microphones:** These capture precise audio and enable effective voice commands even in noisy environments.

- **Eye-tracking technology:** Eye-tracking optimizes interactions by monitoring the user's gaze, reducing cognitive and energy demands.

Ergonomic design

- **Lightweight materials:** The use of titanium, polycarbonate, and innovative composites ensures lightweight and comfortable glasses despite their complex components.

- **Modular designs:** Some companies are experimenting with modular designs that allow users to replace or upgrade components (batteries, lenses) without replacing the entire device.

3. Focus on Meta's Orion project

Overview and progress

Meta's Orion project aims to create a pair of AR glasses capable of replacing smartphones. Developed in partnership with Luxottica, these glasses stand out for integrating advanced connected functionalities into a design that retains the appearance of traditional eyewear.

Key features

- **Heads-Up Display (HUD):** Orion integrates a transparent screen that projects information such as messages, incoming calls, and GPS directions.

- **Environmental interaction:** With cameras and sensors, Orion analyzes the surroundings to display context-specific digital content.

- **Integration with Meta's ecosystem:** Orion connects to Meta's services, such as Messenger or WhatsApp, enabling seamless and integrated communication.

Current development status

- Orion is currently in advanced testing phases with functional prototypes. While Meta has not announced an official release date, demonstrations show significant progress, particularly in display quality and battery life.

- Major challenges include miniaturization and energy management, as AR functionalities demand substantial resources.

Reactions and perspectives

Orion is widely regarded as a groundbreaking innovation, though it raises several concerns:

- **Privacy:** The potential for constant video recording prompts worries about surveillance and extensive data collection.

- **Social acceptance:** Making these glasses aesthetically and functionally acceptable to the general public remains a challenge.

- **Future potential:** Expected advancements include improved battery life, enhanced AI integration, and more intuitive gesture interactions.

Future evolution

Meta plans to expand Orion's capabilities by incorporating applications for professional collaboration and immersive entertainment. Long-term advancements might include holographic displays and advanced contextual AI to enrich user experiences further.

CONCLUSION

Smart glasses represent a technological breakthrough, combining miniaturization, ergonomics, and artificial intelligence to deliver an immersive and seamless user experience.

Meta's Orion project exemplifies this transformation, offering an ambitious roadmap for replacing smartphones. While ongoing innovations in materials and hardware push the boundaries of what these devices can achieve, widespread adoption will require overcoming technical, social, and ethical challenges.



SESSION #03

TECHNOLOGICAL INNOVATIONS & CHALLENGES IN THE OPTICAL MARKET

The new frontiers of optics between technological revolution & market disruption.

The optical industry is at a pivotal turning point. The rise of smart technologies is transforming consumer interactions with eyewear. This evolution, blending high-tech innovations with profound market shifts, was at the heart of discussions within the Silmo Next expert committee.

A wave of innovations at CES: Between immersion and connectivity

CES 2025 once again confirmed the dominant role of immersive and intelligent technologies in our daily lives. Among the standout demonstrations was the Sphere experience, where a U2 concert was broadcast on a 16K screen with stunning sound and visual quality, raising questions about the next steps in augmented reality.

While these experiences are currently limited to large screens and headsets, smart glasses could be the next medium for such advancements. Many experts see this convergence as a major opportunity for the optical market: the ability to offer users a fully immersive experience through wearable devices.

Smart glasses: Is mass adoption imminent?

The smart glasses market is buzzing with activity. Major brands like Meta, Apple, and Google are stepping up efforts to refine their products and expand their audience. Much like smartwatches, smart glasses could soon become an essential part of personal digital equipment.

1. Two competing models

Manufacturers appear to be following two distinct strategies:

- **Screenless smart glasses**, focusing on audio connectivity and AI-driven assistance. Ray-Ban Meta glasses, already sold in over a million units, exemplify this approach..
- **Smart glasses with screens** (monocular or binocular), displaying augmented information. While promising, these models still face challenges in integrating prescription lenses and ensuring sufficient battery life.

2. A market dominated by tech giants

Large corporations have the advantage of developing robust ecosystems, making it easier to integrate smart glasses into a vast network of applications. Conversely, startups struggle to commercialize their products due to a lack of funding and access to a structured market. Some are pivoting toward the B2B sector, which is more accessible and less risky.

Artificial Intelligence: The engine of the optical revolution

AI is central to the adoption of smart glasses. The promise of a personal assistant providing real-time contextual information is as appealing as it is concerning, particularly regarding privacy and social acceptance.

Among the envisioned features:

- **Real-time object and text recognition**
- **Instant translation and live captioning**
- **Smart task organization and notifications**

However, challenges remain: AI must still improve in fluidity and proactivity to meet user expectations.

A challenge for opticians: How to adapt to this transformation?

As smart glasses establish themselves as a strong trend, their adoption could reshape the optical market. Opticians, traditionally experts in customer guidance, now face a shift where brands seek to bypass traditional distribution channels.

1. A threat to the profession?

With major brands (Meta, Apple) opting for direct sales, opticians risk being relegated to a secondary role, limited to fitting corrective lenses. The current business model, based on high margins, could be significantly impacted.

2. A necessary repositioning

To navigate these challenges, the industry must evolve and embrace these innovations by adopting several strategies:

- **Positioning themselves as experts in adapting smart glasses** (integrating corrective lenses, specific adjustments)
- **Developing new skills in optics and digital technologies**
- **Exploring after-sales service and maintenance as new growth drivers**

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Future perspectives and key challenges

As smart glasses approach mass adoption, several questions remain unanswered:

- **What business model will allow opticians to remain key players in the industry?**
- **How can smart glasses be integrated without compromising personal data protection?**
- **Are consumers truly ready to adopt these devices on a large scale?**

What we are witnessing today is only the beginning. Just like smartwatches before them, smart glasses will go through a phase of gradual acceptance before becoming mainstream.

One thing is certain: the optical sector is on the brink of a major transformation. Between disruptive innovations and profound changes in professions, the future of opticians and eyewear manufacturers will depend on their ability to embrace these evolutions while preserving their role as vision experts.

Conclusion

While smart glasses remain an emerging market, their rapid development is pushing the entire optical ecosystem to question its future. In this race for innovation, the challenge will not be solely technological but also economic, regulatory, and social.

Optics, long perceived as a traditional industry, is entering an era where the convergence of healthcare, artificial intelligence, and connectivity is profoundly redefining its landscape. More than a revolution, this is a transition that must be approached with intelligence and pragmatism.

The Silmo Next expert committee will continue to closely monitor these developments to provide valuable insights into the challenges and opportunities of this new market.