

FACT SHEET

VIRTUAL & AUGMENTED REALITY (VR & AR)



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VISUALIZING THE UNREAL

The Essence: A visual representation of a complete or partial artificial world.

Characteristics: When using a VR system, a person will be able to observe and move around in an entirely *artificial environment* and *interact* with various features or items. AR systems, on the other hand, *add layers of virtual objects* to the real environment. Both technologies consist of 1) *hardware* – processor(s), display, sensors and input devices, and 2) *software and algorithms*. A key measure of VR and AR systems is how realistically they can visualize the virtual world, and integrate augmentations with the real world, respectively. The closer the user's *perception of reality* is to the actual world, the more effective and efficient is the experience and outcome. These days, *smartphones and tablets* contain elements like a camera, an accelerometer, a GPS, a compass, etc. – enabling them as potential platforms for AR. For VR, *special goggles* are used to display the virtual environment.

Business value: VR and AR systems have already added value over a wide range of industries and sectors: archaeology, architecture, education, industrial manufacturing, design & planning, commerce and literature. As an example, workplace learning - and knowledge renewal - has shown a real positive impact on workforce effectiveness and efficiency, and manual tasks are assisted with AR for improved efficiency and quality outcomes.

Concerns: There will always be a certain risk related to human bias in modifying the reality, the overload of information, as well as over-reliance on the virtual or augmented reality. Furthermore, the systems' ability to sense and analyze the surroundings in real time is critical and subject to potential error. Legal concerns have been raised in cases where a right to privacy is expected or where copyrighted media are displayed.

Successful implementations: Remote collaboration, learning applications, emergency and crisis management (e.g. research & rescue), social interaction, military battlefield awareness, industrial design, flight training, healthcare planning & practice, navigation, psychological therapy, etc.

Hot tip: These systems are ripe for implementation but do require a multi-disciplined team to ensure optimized business value. For evaluation, use cases will focus on the outcome and not the technology itself.

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