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Visualisation in contemporary design communication

Come the moment, come the technology

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Contents:

Purpose of this paper:

This white paper presents the view that visualisation is one of the most transformative technologies since the advent of the internet, Industry 4.0, the Internet of Things, cloud, Big Data, Artificial Intelligence, and mobility. None of these developments can we now live – or work – without. They are core to what the world of work is today.

The paper explores why visualisation is an increasingly important part of every businesses central nervous system and will become more so in the months and years ahead.” For visionary organisations, it already has. They are your competition. This paper explains why.

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A note on the author

Nicholas John is Industrial Design and Visualisation Manager at Symetri, the UK leader in technology and services for the manufacturing and automotive sector. Nick is passionate about emerging technology and has a track record peppered with successful innovation initiatives. He has created a host of original solutions in design techniques, visualisation and XR in design studios and manufacturing organisations.

Nick assists clients in navigating an ever-changing digital landscape to successfully incorporate new technology and processes into their existing design, engineering and marketing pipelines. He helps guide clients in the automotive, industrial design, AEC and visualisation sectors to capture and communicate design intent in the most accurate and efficient manner. He brings together multi-disciplinary experts specialising in products across design, digital modelling, visualisation and XR tools OEMS and Design Consultancies across the UK and Europe as well as supporting the start-up community in more recent years and for early-stage start-ups.

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Introduction: The essential value of visualisation

Visualisation in design is no longer just a ‘nice-to-have’ capability; it is the pivot of faster and more meaningful pre-prototype design, and project/product design for engineers, designers and manufacturers.

From the automotive sector, to the construction sector, to oil and gas, and original equipment and machinery manufacturing, its value is significant in accelerating progress and reducing costs across numerous activities involved in bringing a product to market. Visualisation is an increasingly valuable and practical approach to training and skills improvement too. Its use is constantly extending, wherever there is a need for unequivocal shared understanding, wisdom, and insight.

There are other considerations. Every business, in every sector, is required to view its activities through an environmental responsibility lens. Legislation increasingly demands evidence of actions to reduce greenhouse gas emissions in pursuance of the UK government’s target of achieving Net Zero emissions by 2050. Customers, supply chain partners, shareholders and even employees expect the companies they deal with to grasp this responsibility.

Sheer force of circumstance due to Covid had an unexpected beneficial effect on the environment.

As we were less able to travel – between countries, let alone to work – transportation activity dropped away and office buildings were scantily occupied. That the levels may bounce back after Covid does not detract from the significance of their dip. The simple truth is, modified behaviours work, a truism that doesn’t require too much proof given its common-sense nature; reduce actions that have potentially harmful environmental impacts, and the impacts are lessened.

The big picture

Climate change and sustainability are major disruptors, of significant scale and far-reaching effect on how we choose to live and how business must increasingly work. A third factor also dictates new behaviours and the pressing need to embrace new technologies in the business world; competition. It can come from anywhere, at any time. It comes fast.

How does visualisation fit into such a global, planetary, context? Surely it can be considered as just the next stage of digitisation, a technology that is both emerging and mature at the same time, a smarter way of working? Does it really merit discussion in an environmental context?

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Definitions and outcomes

Technology removes barriers. Whether it's about working more efficiently, achieving better outcomes faster, reducing costs, or mitigating risk; wherever a problem exists there is usually a solution bound up with, or wholly delivered by, technology. It also creates opportunities, enabling us to express, explore, and realise ideas that might otherwise just have stayed in the realms of the imagination.

Technology brings us together; allowing communication and collaboration to expand beyond the constraints of physical proximity or the distance between locations.

As the world adjusts to living and working in the context of a global pandemic, battling against environmental degradation (global warming) at the same time, these three requirements – efficiency, innovation, and collaboration at a distance – all become more pressing than they may ever have been before. Visualisation strategies comprehensively address each of these requirements.

Accenture's 'Signals of business change'* notes that: "Innovative organizations are working to blend virtual and physical worlds, to build what we call 'real virtualities'". They note: "Virtual realities can…help companies meet sustainability targets: Remote experiences mean less travel, less congestion and lower carbon emissions. In addition, creating realistic 3D images** of virtual prototypes could eliminate lots of manufacturing waste".

* Business Futures 2021: Signals of Change. Accenture: 'The essential radar that leaders need to see and seize the future'.

**(NB: Or assets including real-time visualisation and XR).

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What is visualisation?

Visualisation is the umbrella term for digitally-generated optical assets leveraged to improve communication between multiple parties. These assets are visual, given that they're primarily consumed through our eyes, but visualisation is not exclusively a 'visual-only' methodology. Innovative approaches and democratised technology increasingly allow these assets to stimulate other senses like touch, sound, and proprioception(perception or awareness of the position and movement of the body).In doing so, they further enhance the experience and resonate more deeply with the viewer.

It's not one solution, simply bolted on to your existing design approaches. It is the bringing together of many; a strategic decision/direction, rather than a hardware or software purchase. It embraces extended reality (XR) which is itself the coming together of virtual reality (VR), mixed reality (MR), and augmented reality (AR), to blend virtual and 'real' worlds by creating a fully-immersive virtual experience.

A visualisation strategy can be any combination of static imagery combined with animation, real-time (providing immediate and immersive participation on a shared project), and XR.

On the face of it, that's a potentially confusing array of technology subsets. The trick is not to view them as subsets but rather as constituent strands of a way of bringing concepts and designs alive visually before they even begin to exist physically.

**This is the compelling value of visualisation;
the capability of seeing something long before you have to make it.
In a world where agility is the base level capability,
visualisation is agility redefined.**

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What are the potential outcomes of using visualisation?

In the world of work, the global pandemic has been a disruptor of a magnitude not entirely envisaged when the virus first appeared. It has been both a catalyst and an accelerant for new ways of working. Where many enhancements to working practices were once tangential, they gained greater adoption among forward-thinking organisations. Now, the technologies involved have matured and become critical strategic directions/decisions important for every business.

Visualisation has come more to the attention of business as the rapid wholesale shift to working remotely, across dispersed teams has passed rapidly through three phases:

Improve productivity: Not long ago it was an added-value feature of what we could do with online collaboration technologies; now it is a catalyst for more rapid progression from concept or initial design through to prototyping and then into full production. It can remove some of the laborious, time-intensive, and costly aspects of this cycle; eliminating certain stages that will very soon be seen to have been archaic.

The question will be asked, indeed already is being asked by forward-thinking organisations who have made the shift: why go physical when you can go virtual?

Ensure continuity of operations: With a virus leading to WFH restrictions, it became an essential technology for many businesses simply to maintain their momentum, more about self-preservation. Through this second phase many lessons have been learned about how work may take a very different shape in the immediate and long-term future. The cross-over between working from home and being in the office has given birth to the hybrid office – where the best of both options can be brought into play.

Now, we can work anywhere; with visualisation tools facilitating accurate on-demand communication across geographic, cultural and language barriers.

Embrace disruption: With all these different factors of disruption seemingly arriving at the same time, new work strategies addressing the dispersed workforce infrastructure are shifting from crisis management to the new normal, here for a long time to come; in all likelihood, forever.

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These aspects need to be placed in a context of customer expectations. In a digital world people demand faster responses from the companies they choose to do business with. Supply chains, distribution channels, and clients expect no delays. They expect agility; it is now less a differentiating factor than it may once have been and has become an entry-level requirement. Long drawn-out development cycles and lead times no longer suffice in a fast-paced world populated by demanding customers. Visualisation meets this challenge.

Faster reality: What holds you back?

In assessing the operational, environmental and competitive-edge value of visualisation, it's necessary to look at the many steps involved in the design-to-prototyping-to-production cycle, the development lifecycle.

Pioneering companies like IKEA have proven the value of an enterprise-wide visualisation strategy. It's an approach that can work for products of any size, in any sector (now gaining rapid adoption in the automotive industry, for example) and scaled across departments as the appetite for improved communication increases within the organisation.

IKEA took advanced rendering tools developed in other industries, and commercialised by the gaming industry, and adapted them for industrial and commercial use. The methods are available for anyone to explore. Those who take advantage are proven to boost productivity efficiency. More than that, however, they improve sales' engaging with more customers, faster, globally.

In 2006 IKEA put its first ever CGI product in its catalogue. By 2012, the Wall Street Journal reported that 25% of their products were computer generated, and by 2014 the figure was closer to 75%.

IKEA releases around 9,500 new products a year which, when design differences from country to country are taken into account, results in more than 15,000 items. This range would be impossible to present in the catalogue using traditional photography and catalogue production techniques.
IKEA now generates the bulk of its product visualisation for the catalogue digitally.

This approach is heavy on benefits and serves as a sign-post for how companies can enhance their agility and speed to market through visualisation, while addressing issues around sustainability.

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The 7 wonders of the visualisation world

Beyond innovation

Transformative technologies are valued for their applicability to the ceaseless quest for innovation. A more balanced view is appropriate when considering what visualisation can do for your business. Without a doubt, it does drive and enable innovation. It also has a deeper value in how its benefits can touch your company culture.

Visualisation streamlines existing design approaches, and speeds up time to market. It puts a company in an altogether more friendly place when it comes to issues around the environment and sustainability; while also consolidating the seamlessness required of the hybrid office way of working. It removes restraints that may previously have been imposed due to investment costs, a team's availability in the same place at the same time at the critical moment, and the sheer complexity of developing physical prototypes.

It's not all just about design. In terms of visualising an experience, or task, or procedure, the use of a VR headset enables simulations with tangible measurable benefits. In this regard it has value in training situations particularly (but not exclusively) where the tasks involved necessitate being in hazardous situations. It can be used, for example, to train aircraft maintenance crews and ground staff, landing signal and landing safety personnel, without their being exposed to any dangers while still endeavoring to developed the necessary skills for their tasks.

Visualising the task, and walking people though it in a simulated version of the real-life event, enables them to learn from mistakes. It's a process that helps minimise the likelihood of their making the mistakes at the critical, operational, moment; reducing risk and enhancing safety awareness.

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The new best team: Call on global expertise
You'll often hear it claimed by companies that they have the best team of experts working on new product development. Explore such claims further and it becomes apparent that the team is the best drawn from within a local or commutable geographic radius. There's a good chance that the experts on the team were the winning applicants for the job; they were the best who applied. The best do not all happen to work in the same town, or even the same country or continent. Talent is global. Now, accelerated by mandatory behaviours in the face of Covid, face-to-face collaboration is more global than it has ever been.

Yet there is a step further to take for many companies. This is the step at which visualisation brings talent and collaboration together in its closest form possible – viewing, editing and interrogating 3D models in real-time, making changes in real-time, experiencing as close as can possibly be achieved at a distance, the physical reality of whatever may be under consideration: a building, a car, a machine, a pipeline, a new creation, an essential repair, the smallest detail through to the most extensive scenario.

Rapid prototyping
Visualisation tools are becoming increasingly sophisticated. They enable you to review your data at 1:1 scale, eliminating the need for interpretation of the data in applying it to design development. This enables issues to be identified quickly, long before the expense and time that may be involved in resolving them only once they are in physical form; reducing the reliance on tooling and making physical prototypes. VR collaboration on demand can be convened whenever the need arises to bring all involved parties and their cross-disciplinary talents, to bear on the issues.

No travel
More than just reducing the waste and cost associated with physical prototypes, VR reduces the hidden costs arising from face-to-face stakeholder meetings; shipping, storage, insurance, hotels, travel and meals.

Nothing to hold you back
Within many organisations, 3D assets already exist. They deliver shape, perspective, revolving views, walkaround opportunities, and renderings to bring them alive. Using such digital assets as a basis for visualisation enables you to go to the next step; to interpret the experience of being up close and personal with the asset, sharing the experience with others either to explain the direction of the project (in the case of customers) or adapt it (in collaboration with colleagues, regardless of their own physical location). If you already have 3D IP, visualisation simply enables you to further leverage its intrinsic value.

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Environmentally responsible
No longer are issues of costly prototype manufacture a prime consideration. In particularly high value industries, such as automotive, the shipping of prototypes round the world also involves diligent security, let alone extreme care and caution. These concerns disappear with digital approaches. The significant environmental hit of global travel is also no longer a concern, together with its associated expense.

Customer inclusion and consulting from the very first day
As global collaboration consolidates, extends, and brings greater flexibility to team configuration, visualisation takes centre stage. Traditionally, it may have been the case of taking developments to a 'presentable' stage before involving the customer. Collaboration now brings enormous value to any development process, and customers understand this. Often, however, they need a viewer-friendly insight into the development, rather than an overtly technical one.

Visualisation empowers such communication and can be used to involve the customer and colleagues from multiple disciplines who may have an input to the project, far earlier; avoiding misunderstandings, the necessity for reworks or re-thinking, and wasted time.

For the first time ever, teams involved in the development phase – no matter how the team is configured, who it includes or the chosen software of the user – can achieve real-time synchronised communication by combining VR with cloud platforms and collaboration and simulation via platforms such as the fledgling NVIDIA Omniverse.

Trade show representation (regardless of how they return to commercial life)
It can now be far more efficient to show VR presentations of new models or products than making and transporting finished prototypes. With a visual presentation, an organisation can respond to customers' (and potential customers') suggested modifications in real-time without having to promise to 'get back to them'; accelerating communication and moving faster to satisfactory outcomes for all.

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Final Thoughts

Developing a visualisation strategy

Developing a strategy for visualisation is about far more than dealing with the impact of the pandemic. It's about streamlining the design process to identify, embrace and protect against disruption. This is the way industries are moving. As Accenture says, it is a 'signal of change'.

The value of visualisation – particularly real-time, immersive 3D in the design and engineering process – is significant, with wide-ranging potential for those who recognise it. Those adopting it now will continue to innovate and expand on the lead they gain; much of which will come from their ability to move more swiftly through the development phases and take products to market faster than may have been the case when dependant on traditional design methodologies.

For the automotive industry in particular, visualisation should now be considered by all as a critical part of the modern technical toolkit.

Innovators will continue to push forward, while those that don't adopt immersive 3D technologies will lag behind, more and more.

More than one in three UK architects (35%) now use at least one form of immersive technology*, quoted in a report from KnowledgePoint, which states: "The architecture, engineering, and construction sectors are shifting to using real-time 3D to improve how buildings are designed, built and maintained. Real-time 3D is key to creating digital twins, a virtual replica of a physical asset that, combined with sensor data, can monitor, analyse and predict changes to optimise the performance of the asset".

*The immersive skills storm; KnowledgePoint

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Don’t wait and see – see it all now

Meanwhile, lower barriers to entry will enable more companies to take advantage of real-time 3D benefits in line with the increased appetite for the associated technologies. In the vanguard of these developments are likely to be the more agile companies and start-ups who embrace digitisation unreservedly.

Such companies tend to be unhindered by the hesitation that often characterises new developments in larger corporations; hesitation of the ‘lets-wait-and-see’ variety. As these agile players move forward in leaps and bounds, they pose a heightened competitive threat to industry veterans.

At Symetri we support innovative companies in the building, infrastructure and manufacturing industries to optimise their working methods and increase the quality of their projects. Our purpose is to challenge people to work smarter and to turn ideas into new realities that shape a better future. With a combination of our own IP, best of breed technology from our partners, and a comprehensive range of services, we enable our customers to create sustainable designs, maximise efficiency and increase competitive advantage.

Our services include the provision of software, consultancy, training and support, and we offer a comprehensive range of IT and Document Management solutions.

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