

On the Brink of a Revolution: Architecture, Technologies, and Investments



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Abstract

Architecture as a profession and the understanding of architecture as a field of human creativity and production is now slowly (hopefully) returning to its original mission - to shape physical public space as a communication platform. At the same time, an unprecedented opportunity lies before the field, consisting in making use of the current rapid development of virtual public space, namely virtual (and augmented) reality technologies: this is an opportunity to change the paradigm of architectural design.

Keywords: Architecture; Design; Investment; Public space; Virtual reality (VR)

Opinion

The first trend benefited from Covid-19: it was only when restaurants and offices closed and streets and parks were depopulated that we realized that the internet, Netflix, Tok-tok, and Only Fans were just substitutes: we need to be among live people, to meet them, to talk to them. Quarantine measures, lockdowns, and working from home have fostered the second trend, too. If we are ever going to be dependent on the virtual world and virtual communication, let them at least be as close to physical reality as possible, let us use them as naturally as we are used to in the real world - let them be as 'real' as possible. The two trends meet, merge, and the result is virtual (or augmented) reality: almost all of us have worn a "headset" and viewed spaces and objects "as if they were alive". Even common 3D cinemas, which have been around for a decade (+/-), offer an experience, a dynamic spatial perception unprecedentedly realistic. Nevertheless, we are still - so far - just passive spectators. Yes, the Virtuplex studio in Prague allows real movement in VR on 600 m² of physical space and it offers elementary interactivity, too: Do not like the color of the tiles? Choose a different one from the library and transfers it instantly to the space you are viewing. Do not like the chairs? - Choose a different one from the catalog, and it is instantly in the virtual space you are walking around. Still, that is not designing - that is the old, clumsy process of trial and error; of intuitive blind design - checking it - optimizing it, but again blindly - and so many times repeatedly until you hit "the one" blindly - or until

the author gets so tired that he settles for a suboptimal result. What about to bring the whole process of complex architecture design into VR? Technically, it is, or soon will be possible, but do we have a reason to want to do it? We know the "old" problems: will they disappear in a VR environment? VR environments do offer improvements, making the design process easier and more efficient, more productive. Here is how:

a. Fundamentally, architecture is a spatial discipline - architecture is about the experience of space and in space. However, since time immemorial to the present day, architects have relied on only two-dimensional representations to capture or communicate their ideas. Physical models address this handicap only imperfectly and haphazardly, and even modeling and rendering computer programs are far from a realistic interpretation of architecture. If anyone disagrees with this assessment (as I did until recently), just try VR with a headset on: you will change your mind!

b. A separate, yet very entrenched problem of contemporary "architectural" software, without exception, is their fundamental orientation towards construction elements instead of spaces. The fact that construction elements can be modeled in space does not change the fact that alongside focusing on constructions, the sight of architectural space tends to decline and suffers. The interpretation of both deficits, then, is that architects, without realizing it, design what they can draw or type into a computer

instead of designing what they should design - outdoor spaces, rooms.

c. It is not misleading to compare the usual drawing representations of architecture - from implementation plans to photorealistic visualizations - to the instructions sold with bags of building elements by LEGO. The average seven- or eight-year-old will not build much based on such instructions: we have all that experience. Instead, give him universal “bricks” and a free hand – he will build a house quickly and easily. The building “bricks” of architecture are spaces: architects are not seven- or eight-year-olds, but there is hardly any doubt that they would be able to create more easily and with better results, if they had a kit whose bricks are flexible, changeable, and easy to be “put together” spaces: in VR, this is possible. Then not only will architects find their work easier and faster, but they will also get better results. Quite simply - they will be creating a virtual twin of future architecture in a virtual space!

d. In the end, however, the architecture must materialize, because only in this way can we make full use of it. This demands converting the architectural design (created in VR) into a “builder’s standard”. The most advanced current standard for construction documentation is BIM - and the BIM and VR environments are (so far) two different environments. Will the divergence of these two environments be a major obstacle in designing the material substance of architecture? It must not be! And it is not possible to settle for having to create manually a new BIM model of the building structure from scratch based on the virtual twin of the future architecture in the VR environment. Fortunately, the developers know their stuff and are already working on a smooth interface between the two environments. The VR environment opens up new possibilities not only for designing architecture and planning its physical structures.

e. Designing and planning are communication-intensive: communication within the creative and project team, among the architect and the consultants, with the builder, with authorities, with investors and financial service providers, with municipalities, with communities, with the public. Luckily, hence, VR is a space - an inherently public space, albeit a virtual one: Stakeholders - welcome! Probably not all at once, but still in assemblies and with ease hitherto unimaginable. The communication with creators can be instant: “do you have a comment, a suggestion? No problem - we try it out - you see the result right away”.

f. Moreover, these new technologies perhaps herald yet another unprecedented paradigm shift in architectural design. From time immemorial to the present, the equity of the architect (soon to be the architectural team, the studio, though invisible under the “coat of arms” of the principal) has been his imagination and creativity, and also his technical and organizational knowledge and skills. However, it was all in his head (or rather in the heads of the team that the principal concentrated around him): but it is impossible to invest into someone’s head (not directly at least)!

Hence, this has been making architectural practice the most under-invested amongst the fields of commercial activities that have both day-to-day and long-term, immediate, and mediated major impacts on the lives of people, communities and municipalities, and society as a whole.

In the 1990s, the dot.com era changed our lives and the global economy. It was far from being the work of computer enthusiasts, programmers, and engineers alone: without investment, both speculative and long-term, in the order of trillions of dollars, the dot.com bubble would not have inflated, but more importantly, once it burst, computers, programs, applications, social networks, and information and communication technologies would not have become an integral part of the economy and our lives. Something remained left for the Cinderella of the architectural profession, too: architects who can still get by without the products of the multinational near-monopolists Autodesk, Graphisoft, recently taken over by competitor Nemetschek, or Bentley, are true rarities today. A decade later, clean, and renewable energy enthusiasts have managed to make their way into investors’ sights: and again, thanks to a combination of technicians and big money, photovoltaic plants of all sizes are now as commonplace as heat pumps, wind farms, biomass incinerators and the like. This time, private financial resources have been joined by public resources - state, European, Norwegian, Swiss. Coincidentally, just “before Covid”, thousands of experienced “start-uppers” began to reorient their businesses. Opportunities to build “unicorns”, billion-dollar businesses from scratch, moved from “clean-tech” into the “climate-tech” sphere. Under the banner of climate change mitigation, an era of decarbonizing everything has emerged from sneakers made from coffee grounds to textiles and leather substitutes produced by microorganisms to low-carbon cement or steel made without fossil raw materials. Now, the Covid-19 pandemic has shown that public space and structurally resilient built environments are something we desire perhaps even more than saving the planet. Sure, climate change is an ultimate threat - but the dystopia is only going to come, whilst I want to go to a concert, a pub or a park and meet friends there now. Equally, I want to work (at least occasionally) in an office or shop in a store where there is the least risk of infection now - not sometimes in the future. Thanks to modernism, our public spaces, especially the outdoor ones, are not in good condition: they do not cope with our needs and expectations. Moreover, we architects know how tedious and, thanks to the method of trial and error, clumsy architectural design and planning of buildings is. As a result of the circumstances combined, the built environment, which has daily and long-term, immediate, and mediated major impacts on the lives of people, communities, municipalities, and society as a whole, is nowhere near to what we deserve and could have if only. The poor condition of the built environment and the outdated and inefficient processes of building it is being reminded of for the second time: we architects know about it, or at least we suspect it, and hopefully the public – architects’ 7 billion end customers - are

beginning to suspect it, too: the frustrations of Covid lockdowns tipped the public off. There are still talks on a post-Covid era, however, we all suspect that the 'after' will be different from the 'before': we need to learn to live in the 21st century with epidemic health risks-and we deserve new, better-built environments, communicative public spaces, and quality architecture to survive unharmed. So, the global challenge is here - and VR "coincidentally" shows the way to respond. To do this, however, the public must understand that it can receive, should expect, should demand more from architects than it has so far imagined. And architects have to make their problem, the problem of outdated and unproductive

working tools, a matter of public interest. They have to show that in VR they will be able to design, create architecture and public space more efficiently, more productively, and in a way that better meets the needs of their 7 billion end clients, whether those needs are such that those clients do not yet know about, or "the clients" do not know that they could - should! be met by public space and architecture. Software developers and architects, do you see the opportunity here? Investors, do you see it? After all, improving the quality of a product that 7 billion clients strive to subscribe to is a robust ROI argument; increasing the productivity and efficiency of the production process is then the value-add, the icing on the cake.



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