

A high-angle, architectural rendering of a modern building. The building features a dark, textured facade with a grid of windows. A prominent red window frame is visible on the left side. The building is set against a background of a city street with trees and a road. The image is overlaid with a large, diagonal pink and dark grey graphic element in the bottom right corner.

THE FUTURE OF VISUALISATION IN ARCHITECTURE

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ABOUT UNITY

Unity began life as a game engine, and has enjoyed unprecedented growth, becoming the favourite tool of independent developers as well as large organisations from LEGO to NASA. Unity Technologies serves over 600,000 monthly active developers, a thriving community and Asset Store, and 17 multiplatform deployment options.

Thought leaders in the architectural community have been quick to see the benefits of Unity, with Zaha Hadid, Gensler, Arup and Capita amongst many others all taking Unity licenses.

Unity's software enables architects and design professionals to create 3D immersive representations of their design, which the client and stakeholder can literally walk into and interact with, similar as a user might within a game.

Unlike current visualisation techniques which are primarily static images, a real time interactive visualisation can easily be refreshed when design changes occur, saving time and money.

With the ability to render in real time, and deploy to multiple platforms, Unity presents a powerful tool for the architectural sector.

600

MILLION GAMERS ALL
OVER THE WORLD
ENJOY GAMES MADE
USING UNITY

3.3

MILLION REGISTERED
DEVELOPERS

17

MULTIPLATFORM
DEPLOYMENT
OPTIONS

AN INTRODUCTION TO THE FUTURE OF VISUALISATION IN ARCHITECTURE



ANTONY DOUGLAS VICE PRESIDENT EMEA, UNITY TECHNOLOGIES

“ We believe architectural practices and design firms will profit both creatively and commercially from major shifts in technology over the coming decade.

That’s the standout conclusion from this major survey, the most comprehensive of its kind to understand the relationship between visualisation technology, business practices, the economic climate and the future prospects for design and architectural professionals.

Nearly 1,000 leading respondents from across the globe shared their experiences and sentiments on current trends as well as how they believe technology will fundamentally shift the built design industry.

We wanted to capture insights that would prove beneficial for the sector and examine changes that technology will make for the business of architecture.

We hope you find it useful.



JEFF MOTTLE

CEO, CGARCHITECT

“ Whilst technology has been an established part of the workflow for design companies in the built environment for a couple of decades, it’s clear from this survey that further seismic change will be upon us sooner rather than later. The field of visualisation is a particular case in point, where increased computing power will eliminate barriers such as rendering and make the speed at which creatives can iterate and make decisions faster than ever before.

I believe this survey shows the sector is on the cusp of a very exciting future: we are entering an era of innovation in how we communicate design and pushing the realm of architectural visualisation artistry to the next level. ”





THE FUTURE OF VISUALISATION: A GLOBAL VIEW

The 2014 Unity survey was taken by 967 respondents from 95 countries. The top ten respondent countries were: US, UK, India, Brazil, Australia, France, Germany, Mexico, Canada and Spain.

Architectural visualisation specialists and architects accounted for the majority of respondents. Crucially over half of respondents were decision makers with regards to technology for their companies.

COUNTRIES WITH THE HIGHEST NUMBER OF RESPONDENTS



967

RESPONDENTS FROM 95 COUNTRIES



BUSINESS BENCHMARKING: HOW DOES YOUR BUSINESS COMPARE? THE SECTOR IS BUOYANT

Having faced at least half a decade of very tough economic conditions across much of the globe, architects and design specialists are finally seeing reasons for optimism.

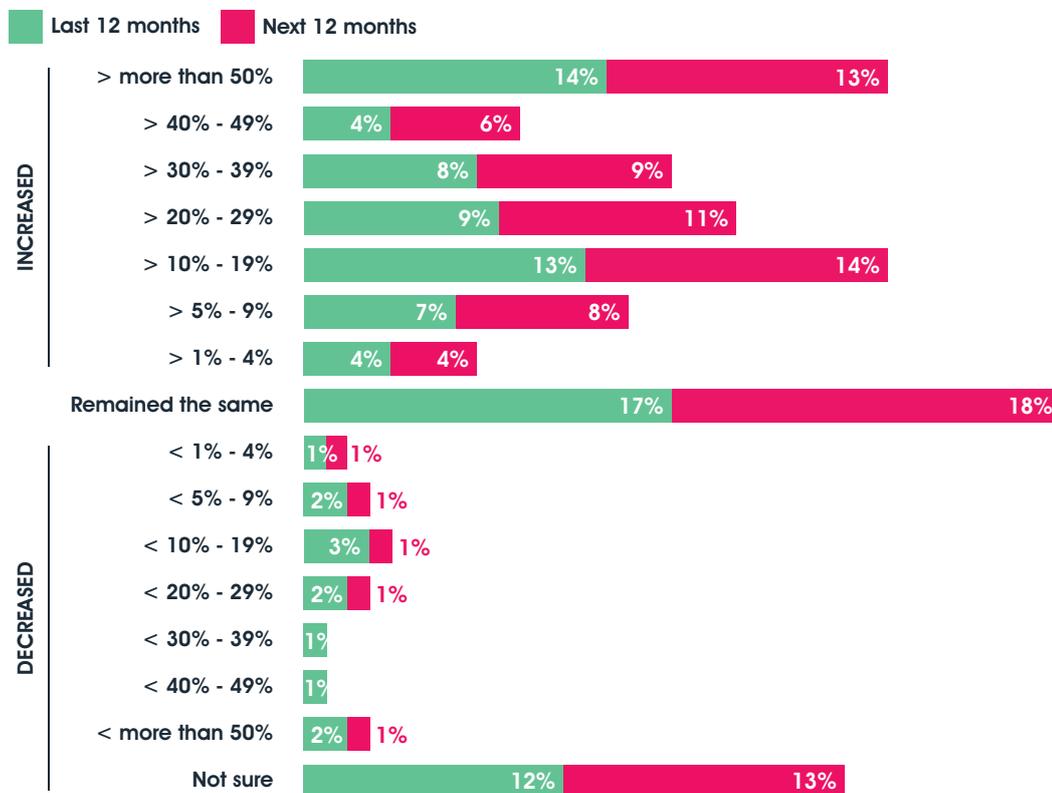
The past year saw revenue growth for two thirds of respondents (67%) and the picture is even rosier for 2014-2015. Exactly three quarters of companies surveyed are expecting to grow in the next year with a mere 5% predicting falling sales.

A BUOYANT SECTOR:

24%

OF BUSINESSES GREW BY BETWEEN 10-30% IN THE LAST TWELVE MONTHS

HOW DO YOU ANTICIPATE YOUR COMPANY'S REVENUE CHANGING IN THE NEXT 12 MONTHS?



“What we discovered from the survey is a very healthy and thriving industry that not only weathered the downturn in the economy, but came back stronger and more diversified than ever before.”

JEFF MOTTLE,
CGARCHITECT



FINDING NEW BUSINESS PRIORITISING MARKETING AND NEW BUSINESS

How do architectural practices and agencies promote their business to secure projects and what are their chances of success?

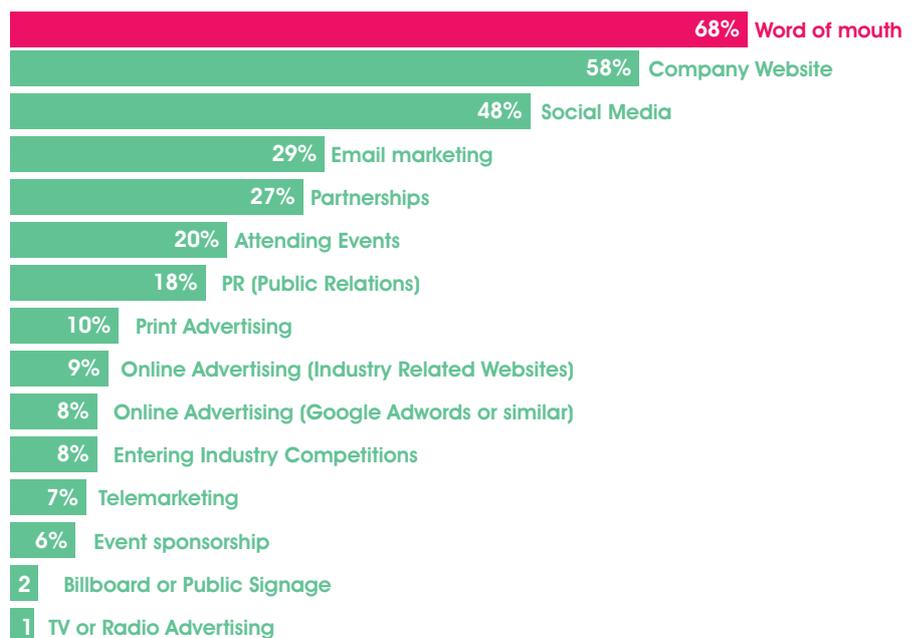
In terms of time spent the majority of companies devote a quarter or less of their company time on marketing, with a third spending 10% or less of time trying to get new business.

Word of mouth is the primary provider of leads for these businesses followed by their company website, social media, email marketing and partnerships.

'Word of mouth is key for us but we don't wait for it to happen; we revisit happy but lapsed clients, we ask for recommendations, we reconnect with people to keep us front of mind'

Survey respondent 2014

WHICH METHOD(S) DO YOU USE TO GENERATE NEW LEADS AND PROMOTE YOUR BUSINESS?





WINNING PITCHES

WHAT IT TAKES TO WIN A PITCH

The survey shows that bidding costs for the majority of respondents are relatively modest, with 61% spending \$1,000 (£615) or less on a bid. A smaller proportion of respondents, 5% of those surveyed, say they invest at least \$10,000 (£6,100) in bids.

In terms of results the win ratio for the businesses surveyed is fairly evenly spread across the field with nearly a half (46%) indicating they win between 40-80% of their proposals (visual below).

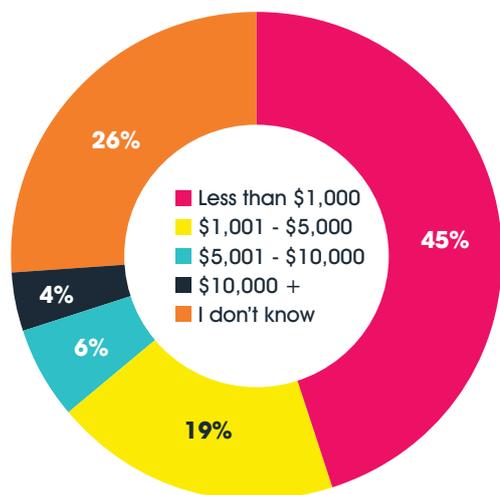
18%

WIN LESS THAN 20% OF THE PITCHES THEY APPLY FOR

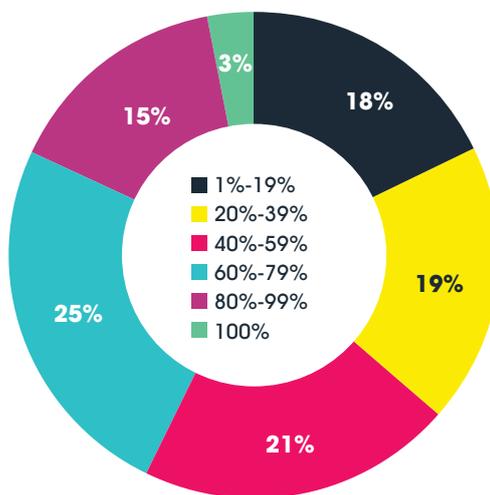
43%

WIN MORE THAN 6 IN 10 OF THE PROJECTS THEY PITCH FOR

ON AVERAGE HOW MUCH DOES THE PITCHING/ BIDDING PROCESS COST YOU IN USD PER PITCH/ BID? (INCLUDING TIME, CONSUMABLES ETC)



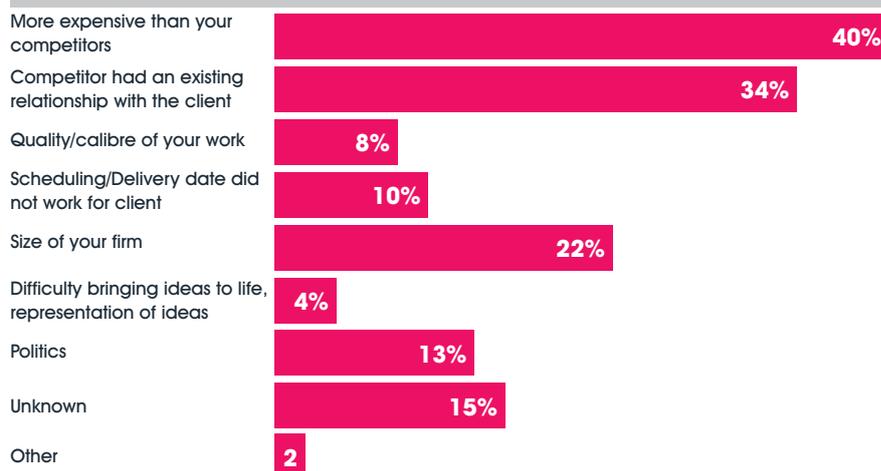
WHAT PERCENTAGE OF PITCHES/BIDS DO YOU WIN?





It's not always smooth sailing for the architects and visualisation specialists in this research. When bids aren't won, price was named as the single largest factor with 40% of the industry indicating they were undercut. Existing client relationships were the second most common reason to lose out on a bid, which just goes to show how important maintaining good relations with your clients can be.

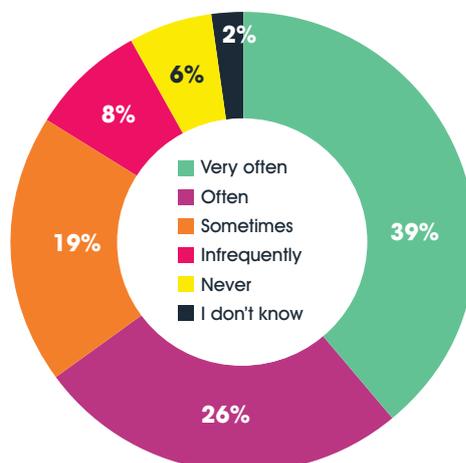
WHAT'S THE MOST COMMON REASON(S) YOU DON'T WIN A PITCH/BID?



“ For a pitch, I didn't want to show up with just a pretty picture. We wanted to showcase the best in new technology. We enabled the client to walk through the space, and experience the space right there in the meeting. And the client loved it. We didn't have any issues presenting it, they loved being able to walk through it. They were very impressed. ”

SCOTT DEWOODY,
DIRECTOR OF VISUALISATION, GENSLER

DURING THE PITCH/BID PROCESS HOW OFTEN DO YOU RELY ON TECHNOLOGY TO COMMUNICATE YOUR IDEAS? (E.G. RENDERING ENGINES, REAL-TIME, MOBILE APPS, VR ETC)



65%

OF BUSINESS USE TECHNOLOGY OFTEN OR VERY OFTEN DURING THE PITCH/BID PROCESS TO COMMUNICATE THEIR IDEAS (E.G. RENDERING ENGINES, REAL-TIME, MOBILE APPS, VR ETC)



WHAT ARE THE MOST SUCCESSFUL AGENCIES/PRACTICES DOING DIFFERENTLY?

We isolated answers from survey respondents that said their revenues were growing compared to those whose business was declining in size or staying the same, to pinpoint the behaviors of businesses that were experiencing success.

◆ OPTIMISM

Of those whose business grew in the last 12 months, 84% believed they would grow this year. Of those who declined or stayed the same last year, only 47% believed they would have more success this year and grow their revenue.

◆ PITCHING

56% of non-growing businesses spend less than \$1000 on the average pitching/bidding process versus 43% of growing practices; 22% of growing practices spend \$1000-\$5000 versus only 16% of non-growing businesses.

◆ MARKETING

Growing businesses make a greater use of social media, partnerships and events to generate leads.

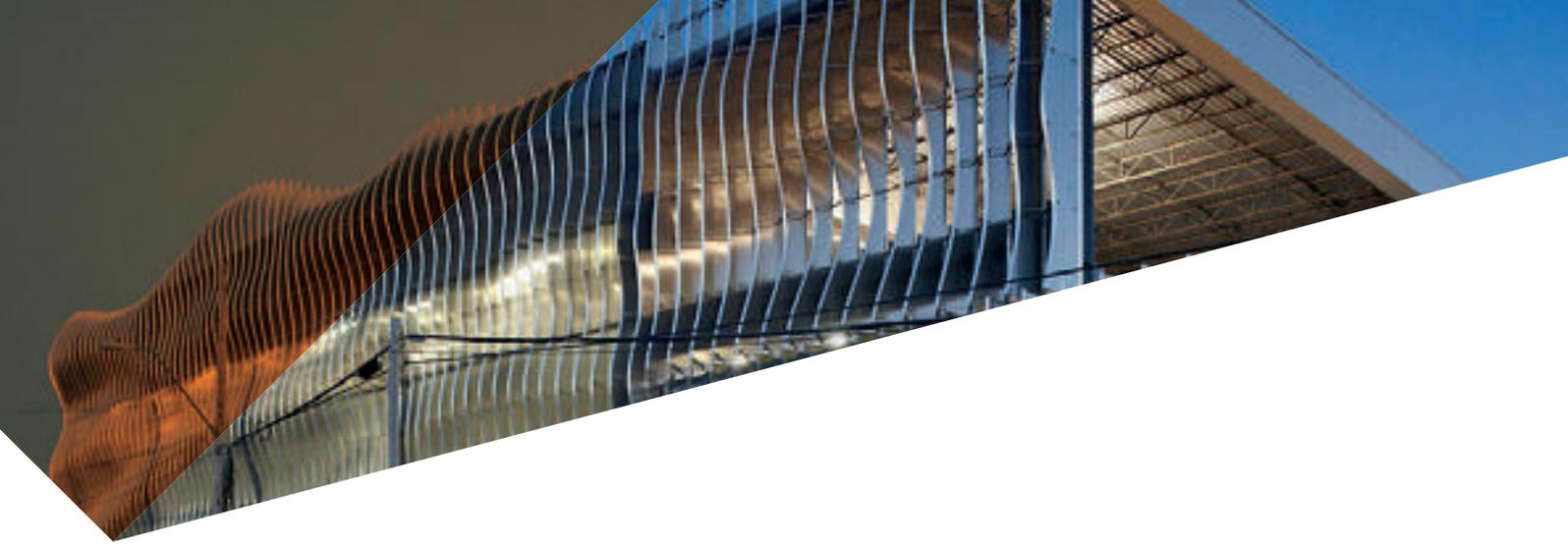
◆ PRICING

Growing businesses focus on ensuring profit margins and pricing are right: only 19% struggle with maintaining profit margins, vs 32% of non-growing business. For growing businesses, the biggest concern is finding staff.

◆ TECHNOLOGY

For a full summary of how the fastest growing businesses use technology, please see page 21.





VISUALISATION TODAY

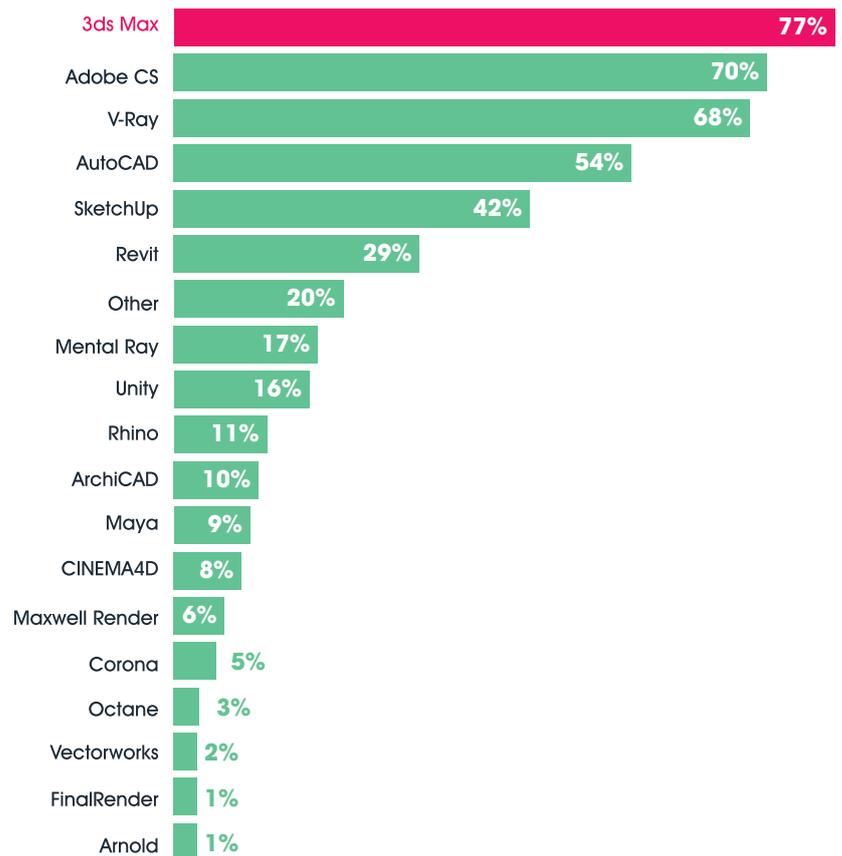
HOW SOFTWARE IS CURRENTLY USED

The survey offers a good snapshot of current trends in technology in architecture, from uses of software to its impact and satisfaction levels with established platforms.

In broad terms respondents overwhelmingly (97% of them) felt visualisation was either important or very important to the overall design process.

Software is at the heart of visualisation work and 3Ds Max and V-Ray continue to be at the forefront of industry usage with 77% of survey respondents indicating they used 3Ds Max in their production workflows, with V-Ray at 68% usage among survey takers.

WHICH SOFTWARE(S) DO YOU CURRENTLY USE IN YOUR PRODUCTION WORKFLOWS?



“ Using Unity, we can render on the GPU in real time, making changes to colours, material and lighting. So not only do we use it as a presentation tool, we also use it as a highly developed design tool too. ”

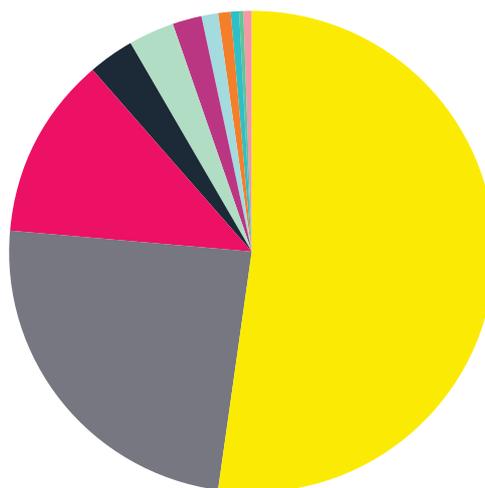
SCOTT DEWOODY, DIRECTOR OF VISUALISATION, GENSLER

Not surprisingly still image creation makes up the majority of how most companies generate profits for this type of work, with 53% indicating this as their top revenue generating activity. Architectural design, CAD and BIM work, came in second place with 25% of respondents selecting this activity, follow up by film and animation work at 13%.

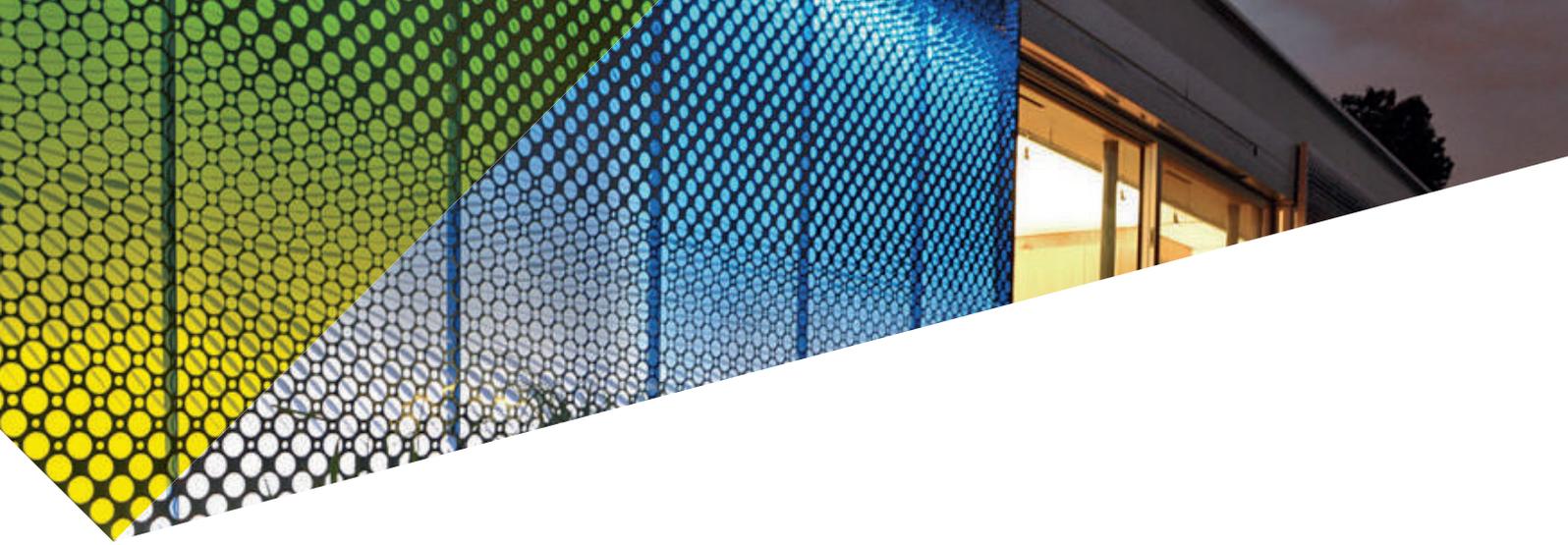
The majority of interactive 3D models are used during the design development stage, followed closely by project marketing. Overall satisfaction with visualisation software remains high in the industry with 80% indicating they are either happy or very happy with their current production software.

There are a number of Real-Time engines available on the market today, but two engines make up the majority of usage among companies in the visualisation industry who currently use real-time engines. Unity accounts for the majority of users in this survey at 59%, followed by Lumion.

WHICH TECHNOLOGY OR DELIVERABLE ACCOUNTS FOR THE MAJORITY OF YOUR COMPANY PROFITS?



- 52%** Still Image Rendering
- 24%** Architectural Design/CAD/BIM
- 12%** Film/Animation Production
- 3%** Real-Time Interactive
- 3%** Other
- 2%** I don't know
- 1%** 3D Stereoscopic Technologies (Displays, Headsets, Glasses etc.)
- 1%** Mobile/Tablet Based Applications
- 0.4%** Virtual Reality (VR) Technologies (i.e. Oculus)
- 0.4%** Augmented Reality (AR) Technologies
- 0.4%** Interactive Physical Installations/ Interactive Physical Models



THE FUTURE OF VISUALISATION

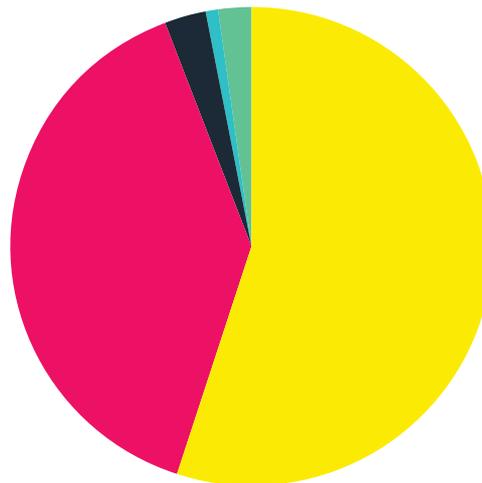
HOW SOFTWARE WILL SHAPE ARCHITECTURE

AND DESIGN IN YEARS TO COME

The experts questioned in the survey were bullish about future prospects for technology, from the improvements in speed and usability of the tools available to the impact of new technology on client relationships and the bottom line.

One respondent summed up the opportunity that an area such as visualisation can provide. **“This industry is still very young and has a lot of potential to grow in various areas. The advancements in technology will not replace artists, however, but will provide them with greater tool sets to create future possibilities. Creativity cannot be replaced with technology, but it can be imagined with it Unity”**
Survey Respondent, 2014.

OVER THE NEXT 10 YEARS HOW INTEGRATED DO YOU FEEL VISUALISATION AND DESIGN COMMUNICATION TECHNOLOGIES WILL BECOME IN CURRENT DESIGN-CENTRIC TOOLS AND WORKFLOWS?



- 55%** Much more integrated than it is now
- 38%** Somewhat more integrated than it is now
- 3%** No change from how it is now
- 0.8%** Somewhat less integrated than it is now
- 0%** Much less integrated than it is now
- 2%** I don't know

93% OF RESPONDENTS FELT THAT VISUALISATION TECHNOLOGY WILL BECOME MORE INTEGRATED INTO WORKFLOWS

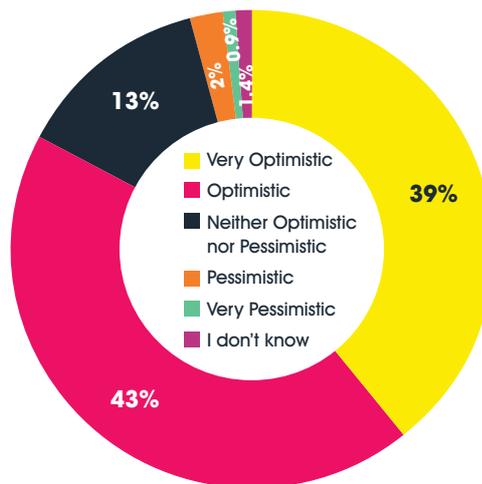


Another respondent supported this view: **“Now more than ever in the past, it is more about the artist’s eye than about the technical aspects and the industry will continue this shift with greater speed every year.”**

Growth of the architectural visualisation field looks strong for the foreseeable future with many professionals predicting that the industry will continue to grow substantially over the next ten years.

Overall optimism about the future of the industry is high with 83% of respondents indicating they were either optimistic or very optimistic about the future of the visualisation industry.

HOW OPTIMISTIC ARE YOU ABOUT THE FUTURE OF THE VISUALISATION INDUSTRY?



84%

OF PROFESSIONALS PLAN TO INVEST IN VISUALISATION TECHNOLOGY IN THE NEXT TWO YEARS.

53%

BELIEVE THAT THOSE WITHOUT BIM EXPERTISE WILL BE LEFT BEHIND



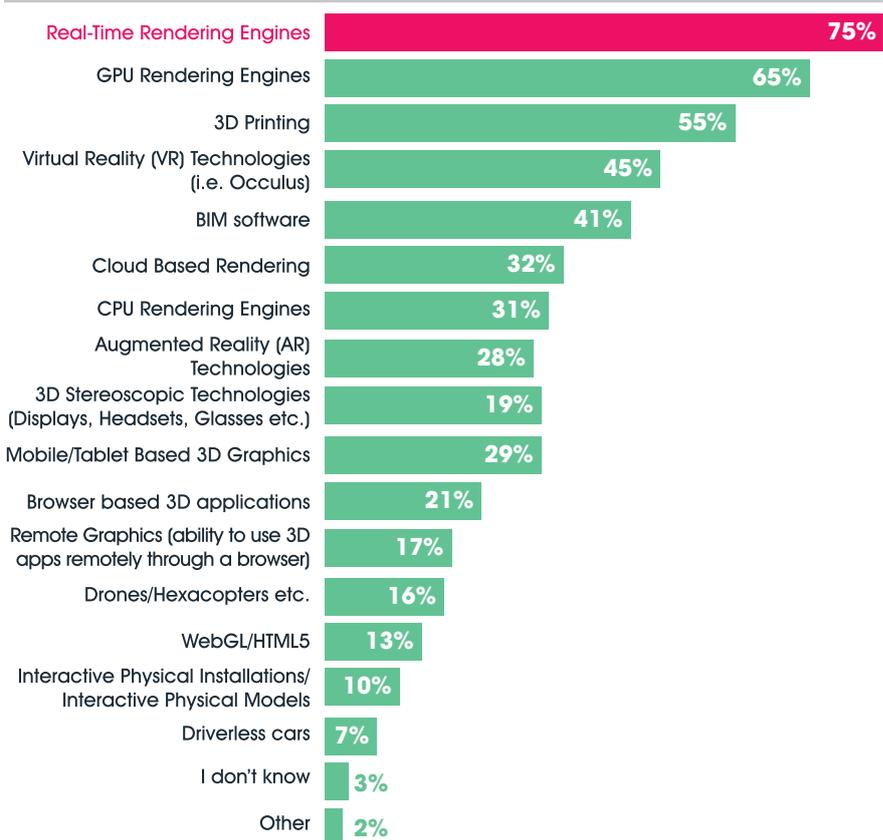


THE RISE OF 3D INTERACTIVE VISUALISATION AND REAL TIME RENDERING

The creation of 3D interactive models has been on the rise for several years and shows signs of continued growth. Over the next five years 74% of respondents indicated they would be developing real-time models. Currently 51% of respondents develop interactive models in-house, with another 8% outsourcing them to external firms.

When asked which technologies would be most impactful on the field of architecture and visualisation over the next ten years, real-time rendering came out on top with 75% of respondents selecting this as their most influential technology. Rounding out the top five were GPU Rendering, 3D printing, VR and BIM software.

WHICH TECHNOLOGIES DO YOU THINK WILL MOST IMPACT THE FUTURE OF THE FIELD OF ARCHITECTURE AND VISUALISATION IN THE NEXT 10 YEARS?



OF THOSE WHO USE REAL-TIME TECHNOLOGY **59%** USE UNITY



Within the next ten years, the vast majority of professionals feel that not only will most rendering software render in real-time (79%), but that real-time visualisation will be part of everyday workflows (77%). This will be largely driven by client demand: 74% believe they will be developing or sourcing a real time interactive model for their clients in the future.

This trend will only accelerate as the millennial generation takes up more responsibility with the design sector as well as within clients. As one survey respondent put it we will see “further integration of technology as a younger generation grabs hold of decision making roles.”

“There is a culture shift in non-tech industries. The new wave of high-level executives controlling these industries have grown up around video games and real-time technologies. This means they are embracing them at a rate never seen before. This means demand for real-time experiences will only increase.”

Doug Wolff, Innovation Director, ZeroLight

“Over the next ten years waiting minutes or hours for a frame to render is going to be a distant memory of the past. Advancements in real-time rendering engines, CPU and GPU rendering algorithms and the ability to scale compute power almost infinitely, will put the power back in the hands of the artist. Visualisation will be more synonymous with digital photography than the obscure and confusing parameters and settings we use today”.

Jeff Mottle, CEO, CGarchitect

“I think it’s going to get to the point where people are going to expect to be able to walk around their space. The future is in real time rendering, in being able to simulate light and materiality almost instantaneously over the Cloud, and giving the client that level of interactivity.”

Scott DeWoody, Director of Visualisation, Gensler

77%

OF RESPONDENTS BELIEVE 3D REAL TIME VISUALISATION WILL BE A PART OF EVERYDAY WORKFLOWS IN THE FUTURE

75%

OF VISUALISATION PROFESSIONALS THINK REAL-TIME RENDERING WILL BE THE MOST IMPACTFUL TECHNOLOGY ON THE FIELD OF ARCHITECTURE AND VISUALISATION



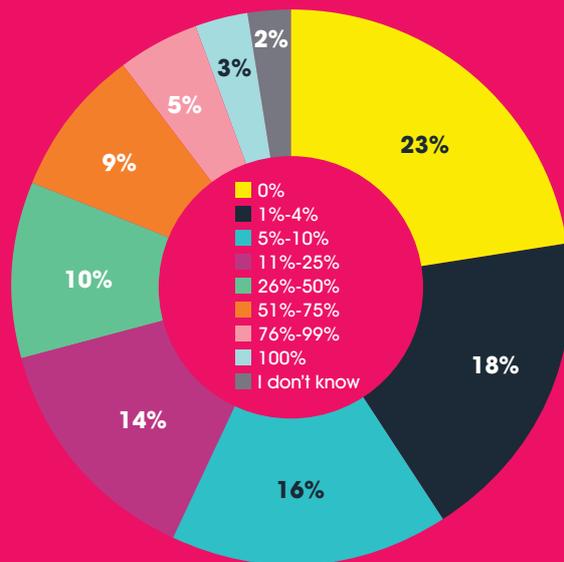
CLIENT RELATIONSHIPS AND VISUALISATION

"The tools to communicate experience are really lacking in our industry. What we're able to do currently is say, 'here's the rendering from a specific point of view', or, 'here is a movie flythrough going through your property', but those are prescribed paths of travel.

What a tool like Unity lets us do is create fully interactive environments, where the client can traverse and navigate on their own, and go to the places that they're most interested in seeing, and see the details they're most interested in seeing. And as a result, we're able to communicate more effectively to them what the experience of being in their environment's going to be." – Scott DeWoody, Director of Visualisation, Gensler

Respondents see client demand for these technologies reaching sky-high levels. "Clients will come to expect real time renderings for every project," said one respondent while another saw how much more engaged clients will become as a result. "I think it really could change how clients think about the work and take a much bigger part in the design development process."

WHAT PERCENTAGE OF YOUR CLIENTS HAVE ASKED FOR REAL-TIME INTERACTIVE 3D MODELS OR HAVE HAD REAL-TIME INTERACTIVE 3D MODELS INCLUDED IN THEIR PROJECT IN THE LAST 2 YEARS?



61%

OF RESPONDENTS HAVE HAD CLIENTS ASK FOR REAL-TIME INTERACTIVE 3D MODELS OR HAVE HAD THEM INCLUDED IN THEIR PROJECT



74%

BELIEVE THEY WILL
BE DEVELOPING OR
SOURCING A REAL
TIME INTERACTIVE
MODEL DUE TO
CLIENT DEMAND
IN FUTURE



TECHNOLOGY AND REVENUE: GROWING BUSINESSES PRIORITISE THE USE OF NEW TECHNOLOGIES

The analysis comparing faster growing companies and those lagging behind also highlights differences in the investment in and the use of architectural visualisation software. Overwhelmingly, growing businesses take advantage of technology more than non-growing business.

Faster growing businesses rely on technology to communicate their ideas during the pitch/bid process 64% of fast growing agencies use technology often or very often, vs 54% of business that didn't grow their revenue.

A reliance on still image rendering is a characteristic of smaller businesses; 54% attribute the majority of their profit to still image rendering for this type of work in a small business, versus only 25% of larger businesses.

Businesses with growing revenue are 30% more likely to be using Unity than businesses where revenue is static or in decline.

It is clear that a focus and investment in software and technology is tied to business success.

“What a tool like Unity lets us do is create fully interactive environments, where the client can traverse and navigate on their own, and go to the places that they’re most interested in seeing, and see the details they’re most interested in seeing. And as a result, we’re able to communicate more effectively to them what the experience of being in their environment’s going to be. Experience is becoming a more and more important part of selling the concept of a job.”

Scott DeWoody, Director of Visualisation, Gensler

FASTER GROWING
BUSINESS USE
SOFTWARE IN THEIR
WORKFLOWS ON
AVERAGE

21%

MORE THAN THEIR
NON-GROWING
PEERS

“Effectively what we’re doing as architects is the creation of a 3D space; when you go into a building it’s immersive, so we are definitely interested in taking that into our simulations and our design projections.”

HELMUT KINZLER, ASSOCIATE AT ZAHA HADID ARCHITECTS

INDUSTRY INTERVIEWS

We spoke to two major architectural practices about their current use of visualisation technology, its key benefits to their businesses and how they see software evolving.

SCOTT DEWOODY DIRECTOR OF VISUALISATION GENSLER

Scott DeWoody oversees visualisation at the global practice and already sees the benefits that the newer technology offers, particularly in pitching to as well as communicating with clients. The Unity platform allows them to get real time interactive feedback from the client. Design changes are pushed into the system, a link is sent to the client and immediately Gensler are walking clients through designs on the phone which makes them “feel a little more part of the design process” according to DeWoody. “They’re more involved; all of a sudden they’re walking through their space. Their view and their mindset changes a little bit when you do that, and we’ve gotten very good results from that,” he adds.

“If we can communicate to a client what they’re going to feel, and what they’re going to experience, then we’re more likely to be successful in getting buy-in for that pitch.”

The ability to create fully interactive environments, where the client can traverse and navigate on their own is the “most powerful part of using Unity” to DeWoody’s mind. This allows Gensler to better communicate innovative parts of their designs. “Experience is becoming a more and more important part of selling the concept of a job. And these tools are allowing us to better communicate that experience, and give some of the more forward thinking ideas that we present a better chance at getting understanding and getting approval.”



HELMUT KINZLER ASSOCIATE ZAHA HADID ARCHITECTS

Whilst the practice's use of Unity is in its trial stage "it is definitely the future" says Helmut Kinzler, Associate at Zaha Hadid Architects. Currently the globally renowned company investigates the technology in order to produce interactive and animated visualisations for pitches to its clients but an additional usage they see as of particular significance is in the area of Real-Time design evaluation, using the game engine as a tool to supporting design processes for interiors within the workflow of the practice. "A key reason for using a game engine like Unity is being able to visualize, enter the design, and to evaluate what we're doing. It's a completely new form of looking at our design, and helping evaluate and improve control over our design," says Helmut. The speed at which Unity works as well as the subjective immersive experience it outputs are aligned with the nature of work that the firm produces. "We do complex and involved designs, and in order to understand their complexity and situation, you have to look at it in 3D, in order to get all contextual and design information visualized." So instead of waiting a day for rendered results, real-time rendering will help "tremendously". Kinzler adds that "... with a fast, real-time engine we can see the results and test some of the issues like materials, scaling, lighting, functionality and the overall composition of the design, immediately," he says.

“ If we want to make a rendering with the current commonly software, we will have to wait a day, to have this output. But with a fast, real time engine we can see the results and test some of the issues like materials, pictures, lighting, and the whole composition within the design, immediately. ”

For Kinzler, the future will offer greater certainty in digital modeling particularly in areas such as the simulation of lighting and in the coordination of specialist engineering input. "I think the emergence of 3D digital design has now been advanced to the level where we as architects can refine and utilize all aspects of a project for our own design purposes," he says.

SUMMARY - KEY TAKEAWAYS

1

Technology drives growth for architecture and design businesses. **Faster growing business use software in their workflows** on average 21% more than their non-growing peers. And businesses with growing revenue are 30% more likely to be using Unity than businesses where revenue is static or in decline.

2

In a decade **real-time will be the norm**. The majority of professionals feel that not only will most rendering software render in real-time (79%), but that real-time visualisation will be part of everyday workflows (77%).

3

Client demand will drive the rise of 3d interactive models. 74% of respondents believe they will be developing or sourcing a real time interactive model for their clients in the future. "I think it's going to get to the point where people are going to expect to be able to walk around their space" says Gensler's Scott DeWoody.

4

Real time will be driven by the **millennial generation**. As one survey respondent put it we will see "further integration of technology as a younger generation grabs hold of decision making roles."

5

Real-time will offer more certainty for design professionals. "I think this has now been advanced to the level where we as architects can refine and utilise it for our own design purposes," says Kinzler from Zaha Hadid

6

Real-time will be the **most impactful visual technology of the next decade**. When asked which technologies would be most impactful on the field of architecture and visualisation over the next ten years, real-time rendering came out on top with 75% of respondents selecting this as their most influential technology.

7

Real time will allow designers to focus squarely on creative matters. One respondent said: "Now more than ever in the past, it is more **about the artist's eye** than about the technical aspects and the industry will continue this shift with greater speed every year."

8

As designs become more complicated 3D becomes more important. Practice Zaha Hadid see tools such as Unity as vital in the internal design process, both speeding this up but also creating a fuller experience of how their designs will work in reality.

9

Optimism is sky high for the visualisation industry: 82% of respondents are very optimistic or optimistic about future prospects for the visualisation industry.

10

Visualisation will increase client engagement and satisfaction. Walking clients through 3D designs makes them "feel a little **more part of the design process**" according to Scott DeWoody from Gensler.



GET IN TOUCH FIND OUT HOW UNITY CAN BENEFIT YOU

With Unity's 3D real time visualisation platform, you'll experience:

FLUID WORK FLOW

It is easy to import models from design programs such as Autodesk Revit, ArchiCAD or Sketchup Pro

READY-MADE ASSETS

Save critical time and go to the Asset Store to find any asset you need, plus lots of demos and tutorials.

MULTIPLATFORM

With Unity you can seamlessly deploy to PC, Mac, Linux desktop, the Web (via the Unity Web Player), iOS, Android, Windows Phone 8, Windows Store Apps or BlackBerry 10.

RAPID RENDERING ITERATION

Unity allows you to render rapidly for optimal user experience and efficiency.

To request a free demonstration of Unity's 3D Visualisation platform for architecture, engineering and construction, please contact:

Morrissey Williams

Email: mo@unity3d.com

Tel: +44 1273 987 441

www.unity3d.com/industries/aec

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