Innovation Insight for Visual Configuration

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Initiatives: Digital Commerce Technologies and 1 more

Visual configurators are mature, robust and ready for widespread deployment. Application leaders responsible for sales and digital commerce applications should disrupt their industry by being among the first to offer visual configuration.

Overview

Key Findings

- Companies that implement visual configuration solutions see significant improvement in their deal win rate, lower costs for drafting design files (e.g., CAD), less rework in the factory and lower carrying costs for samples at retail locations.

- There are currently about 30 vendors that offer 2D visualization, 3D visualization and/or design file generation.

- Mixed reality (MR), augmented reality (AR) and virtual reality (VR) visual configuration continue to be experimental technologies that have not seen widespread adoption.

Recommendations

As an application leader responsible for sales applications and digital commerce technologies, that can improve sales and customer experience, you should:

- Deploy a 3D visual configurator in the self-service channel for relatively simple configurable products, where there are a lot of combinations of options and the final look of the product is important (e.g., an automobile or a sofa).

- Enable your in-store sales team to show special order products (e.g., a custom kitchen) on a tablet or VR headset before it is ordered.

- Equip your direct sales team and channel partners with tablets running 3D or MR configurators to demonstrate your products at customer sites.

Analysis

Visual configuration is a transformative technology. Organizations that are among the first to adopt it in their industry experience substantial competitive advantage and cost savings.
Competitors then have to react quickly with their own visual configuration initiatives to remain competitive. These transformative benefits, along with significant recent improvements in technology, such as improved photo-realism, are leading to rapid growth in this sector of the applications market. Gartner estimates that the market for visual configuration applications and related services was $142 million in 2019, up 35% from 2018.

Adoption is now widespread across multiple industries as shown in Figure 1.

**Figure 1: Visual Configuration Revenue by Industry**

**Visual Configuration Revenue by Industry**

- **41%** Manufacturing
- **21%** Retail
- **20%** Home Design
- **5%** Vehicles
- **7%** Apparel
- **5%** High Tech
- **1%** Other

Source: Gartner (May 2020)

Visual configuration technologies can be applied in multiple sales channels. Software vendor revenue is split between customer sales channels as shown in Figure 2.

**Figure 2: Visual Configuration Revenue by Sales Channel**
For the direct and indirect sales channels, visual configuration technology is usually integrated with a configure, price and quote (CPQ) application suite. For the digital commerce and store channels, visual configuration technology is usually embedded within a digital commerce experience, such as SAP Commerce or Adobe Commerce Cloud, enabling customers to configure simple or complex custom products on their own. Even for the direct sales channel, users now expect a consumer quality user experience.

Definitions

Visual configuration tools enable sales representatives and end customers to see a visual representation of the products they want to order, with the options and features they have selected. These tools are usually deployed as part of an overall CPQ solution or digital commerce project. The best technologies enable the user to interact directly and in real time with the visual representation. Visual configuration tools can be used to sell a wide range of configurable products, anything from coffee mugs to excavators.

“Visual configuration” describes several different technologies that enable customers to see a depiction of the product they are ordering. These are 2D, 3D, virtual reality, augmented/mixed reality, floor space planning and computer-aided design (CAD) automation. Visual configuration goes beyond the static images or even static 3D models displayed on many consumer websites. A visual configurator shows the specific options and features selected by the customer. This can
include text and images uploaded by the customer. The visual depiction is closely coupled with an underlying configuration model that ensures that all business and technical limitations are enforced as selections are made. The 2D and 3D images can be included in a Word or PDF proposal generated by the CPQ tool (see Figures 5 and 6 below).

These different visualization technologies are described below.

2D

A 2D visual configurator displays one or more 2D projections of an object on the screen. It is particularly useful for drag-and-drop positioning of elements and displaying labeled lengths. While sometimes less visually compelling than the 3D technologies, it can be faster and easier to use. Figures 3 and 4 below are good examples of a faux-3D configuration that is constructed by layering 2D elements. These are not truly three-dimensional because the product can only be viewed from a fixed perspective.

**Figure 3: 2D Visualization of Sofa**

*Create Your Own

*You have choices. Customize now.*

![Figure 3: 2D Visualization of Sofa](source: ThreeKit)

**Figure 4: 2D Visualization of an Embroidered T-Shirt**

Source: ThreeKit
Source: Artifi Labs

**Figure 5.** 2D Visualization of Door Placement in a Building

Source: Configure 1st

**Figure 6:** 2D Visualization of Window Shutters
A 3D visual configurator displays a 3D image of a configured product on the screen with accurate perspective, textures and shading. Tools can either show the product from a fixed number of viewing angles or allow the user to explore freely within a 3D space, viewing the product from any distance and angle. Fixed viewing angles enable better photorealism because much of the rendering can be preprocessed.

Widespread adoption of 3D visual configuration is made possible by Web Graphics Library (WebGL). WebGL is a JavaScript API for rendering 3D graphics which is supported by all the most popular web browsers without the use of plug-ins. It uses the graphics processing unit (GPU) on the client machine to render high-quality images in a webpage in real time. See Figures 7 through 12 for examples.

**Figure 7: 3D Visualization of Batting Glove**
Figure 8: 3D Visualization of a Conveyor System

Figure 9. 3D Visualization of a Basketball Uniform

Source: ConfigureID

Source: Atlatl
Figure 10: 3D Visualization of a Pipe System

Source: Configit

Figure 11: 3D Visualization of a Weighing System

Source: Configit
The most advanced 3D visualization tools support “hot spots” and “docking points,” where the user can interact directly with the 3D image. A hot spot might be used to open a door or animate a piece of moving machinery, or to “fly” the user into the interior of a vehicle. It can also trigger the display of a visual menu of choices that can be applied to that part of the product. Docking points allow...
components to be dragged from a palette onto the 3D image and attached. These visual interactions are performed in the context of the underlying technical constraint of the product.

**Virtual Reality**

A virtual reality (VR) visual configurator places prospects inside a computer-generated 3D scene, where they can look in any direction, move about and interact with the product (see Figure 13). VR is particularly effective when designing interior spaces such as a custom kitchen or an office layout. Although it can run on tablets using in-built motion sensors, VR is most effective when experienced through an immersive headset, such as Samsung Gear VR or Oculus Rift, or a smartphone holder with close focus lenses such as Google Cardboard. Product options and menus appear floating in space and can be selected by hand gestures. When using an immersive headset, vendors must be careful to establish a safe space for the VR experience where users cannot injure themselves.

![Figure 13: VR Visualization of a Kitchen](image)

Source: 3D Source

**Augmented Reality/Mixed Reality**

Augmented reality (AR) visual configuration overlays a 3D representation of the product being configured onto a background captured live by the camera of a handheld device. For example, a sales representative could show their prospect a new garden deck from any perspective while walking the site at the back of their house, or a customer could see a new piece of furniture situated within their family room and change the material and colors to match the existing furniture.

AR configuration first appeared in 2016. The best products can now overlay a photorealistic image of the product in real time without placing a physical image marker in the scene. See Figures 14 and 15 for examples.
Figure 14: AR Visualization of a Glass Building Using a Smartphone

Source: Animech

Figure 15: AR Visualization of an Armchair

Source: Marxent
Mixed reality (MR) places the configured product into a real-world scene viewed through a VR headset and allows the user to interact with the virtual product.

**Floor Space Planning**

Floor space planning (FSP) visualization tools are optimized for organizing the contents of a building. FSP tools combine 2D and 3D visualization techniques and can also generate photorealistic 3D images for inclusion in a proposal. See Figures 16 and 17 for examples.

**Figure 16: Floor Space Planning of a Gymnasium**

Source: Axonom

**Figure 17: Floor Space Planning of a Tradeshow Stand**

Source: Expivi
Computer-Aided Design

Some visual configuration tools support generating a computer-aided design (CAD) diagram using the selections made in a product configuration (see Figures 18 and 19 for examples). Attributes captured or calculated by the configurator are combined with a CAD template to generate CAD output in a range of formats. These include Autodesk Inventor, Dassault Systèmes’ CATIA and SolidWorks, PTC’s Creo and Pro/ENGINEER, and Siemens’ NX. These CAD drawings are used both in sales proposals and in the factory. It is also possible to generate CAD drawings directly on your website so engineers can include components in their designs. This capability often leads to a “design win” where the vendor providing the CAD drawing is automatically selected as the supplier.

Figure 18: CAD Drawing Generated for an Immersible Pump

![Figure 18: CAD Drawing Generated for an Immersible Pump](source: Infor)

Figure 19: CAD Drawing of a Circuit Breaker
A key difference between visual configuration systems is how they support the mapping between the attributes and actions in the nonvisual configuration model and the attributes of the visualization. For example, the attribute "material" must be mapped to one of many texture bitmaps and rendered on certain parts of the product in the visualization. Some vendors rely on custom coding to implement the mapping. Others have declarative tools for internal use but provide the mapping only as a service performed by their own team. A few companies have graphical mapping tools that enable tech-savvy business users to set up the mappings in an administration portal.

To ensure the best performance, especially when running on mobile devices, it is necessary to simplify existing 3D CAD models that were originally created for engineering to include only components that directly impact the visualization. Some visual configuration systems provide admin UIs to support this simplification process. Others rely on standard 3D modeling tools such as SolidWorks.

Benefits and Uses

Companies that implement visual configuration technologies for configurable or engineered products report significant business benefits, these include:
Higher win rates because of faster creation of proposals that include CAD drawings or 3D renderings of the ordered product. For example, a large manufacturer reduced the time to generate a proposal from 4 weeks to less than a minute.

Higher win rates because the company is perceived to be technologically advanced.

Higher win rates because prospects are more confident that they will receive the correct product if they can see it at ordering time (e.g., a 15% increase in add to cart rate).

Higher win rates because the product is more compelling to customers if they can see it and interact with it. For example, same-store sales increased 20% after a VR pilot enabled prospective customers to walk through their new custom kitchens. AR/MR has the potential to be even more impactful because prospects can see the new product in their own home or business premises.

Companies deploying 3D visual configuration on their website experienced a 10-50% increase in cart conversion rate and an increase in average order value of 30% to 50% because of higher attach rate for add-on features.

The ability to sell innovative customizable products that were not previously feasible (for example, custom sports shoes).

A reduction in the number of questions and inquiries from dealers.

Lower rework costs, lower return rates (in one example, from 20% to 1%) and higher customer satisfaction by eliminating miscommunication between the customer and the vendor.

Reduced or eliminated cost of manually drafting CAD drawings for proposals and manufacturing.

Reduced need for physical samples and inventory items in sales showrooms and at tradeshows resulting in a 20% cost saving.

Reduced time to train a sales representative.

Adoption Rate

The adoption of visual configuration technologies is still low. Table 1 shows the total number of deployments for each technology for the vendors that responded to our survey. Gartner expects adoption to expand rapidly now that this technology is built into leading cloud CPQ solutions, is integrated with leading digital commerce suites, and is enabled for web browsers and tablet devices. Google’s ARCore and Apple’s AR toolkit have the potential to enable the mass adoption of Augmented Reality. The recent global pandemic might accelerate the adoption technologies such as these that enable remote selling of customizable items.

| Table 1: Adoption of Visual Configuration Technologies |
### Risks

When selecting a visual configuration tool, application leaders should consider the following questions:

- **Will my team be able to create and maintain the visual configuration models?** Choose a full-service vendor that will do the work for you or ensure that the chosen product has an easy admin environment (i.e., no coding).

- **How is the visualization integrated with the configuration model?** Achieving interactive visual configuration requires a close coupling of the visual model and the configuration rules model. In some solutions this is elegantly productized. In most it requires considerable manual work, sometimes at the XML or code level. Be wary of integrations that were only built for demonstration purposes and may not be fully supported in the future.

- **Is the visual configurator integrated with my digital commerce platform?** If there is no productized integration, then budget for the work to synchronize the sales catalog and pricing...
rules, and to copy the bill of materials (BOM) generated by the configurator into the shopping cart. You must also store sufficient configuration in the shopping cart that the configuration can be restarted if the customer wants to make changes to their original selections.

- **Is the vendor viable?** Most dedicated visual configuration software vendors are quite small. This makes them vulnerable to financial problems and acquisition.

- **How capable is the 3D visual configurator?** Not all 3D visual configurators are created equal. The weakest can only generate a 3D depiction on demand — when a user clicks a button. Better solutions will continually regenerate the image in real time as changes are made. Only a few 3D visual configuration tools support 3D depictions that you can interact with via drag-and-drop and hotspots.

**Recommendations**

In many industries, it is still possible to be an early adopter of visual configuration technology. Early movers will take market share from their competitors by significantly changing the way in which products are sold. If one of your competitors is already using this technology, then you are likely being outsold and need to react quickly with your own initiative.

Create a library of high-poly 3D models of your customizable products. This enables the same visuals to be leveraged across multiple touchpoints and use cases, reducing technology costs and time to market.

Consider a multichannel strategy that uses the best visualization approach and device for each channel. For example:

- Deploy a 3D visual configurator in your self-service channel for relatively simple products where there are a lot of combinations of options and the final look of the product is important (such as an automobile or a sofa).

- Enable your in-store sales team to show special order products (for example, a custom kitchen) on a tablet or VR headset before it is ordered.

- Equip your direct sales team with tablets running 3D or AR/MR configurators to demonstrate your products at customer sites.

Ensure that your visual configurator is an extension of your multichannel CPQ solution. Not all products will benefit from visual configuration, and you need to quote and order both visual and nonvisual products together.

Carefully evaluate the ongoing cost of creating and maintaining visual configurators. Ensure that your vendor has the skills and experience to guide you through the process. Check that the
software product is easy enough to administer so that your own team can take on the work at some point in the future.

Representative Providers

The following is a representative list of visual configuration providers. It identifies the key visual technologies that each vendor provided as of May 2020.

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Gartner (May 2020)

Evidence
A Gartner survey of 23 vendors conducted in January 2020

Gartner vendor briefings

Gartner client inquiries

Document Revision History

Innovation Insight for Visual Configuration - 19 December 2018

Innovation Insight for Visual Configuration - 14 June 2017

Recommended by the Author

Magic Quadrant for Configure, Price and Quote Application Suites

Critical Capabilities for Configure, Price and Quote Application Suites


Recommended For You

Magic Quadrant for Digital Commerce

Critical Capabilities for Digital Commerce

Gartner Peer Insights 'Voice of the Customer': Digital Commerce

Hype Cycle for Digital Commerce, 2019

Prepare for Cryptocurrency Payments in Digital Commerce

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