3D Scanning For Online Real Estate Platform - Part B

Final Version

23/05/2021

Project Members

Tao Bai (tbai5171@uni.sydney.edu.au)

Felix Gao(fgao2584@uni.sydney.edu.au)

Ruixian Liu(rliu0898@uni.sydney.edu.au)

Dongrui Wang(dwan7325@uni.sydney.edu.au)

Table of Contents

Relevance to Organization's goal/objective/focus

The relationship between the implementation of 3D scanning technology and the Real Estate company's business value has two main components: reducing costs and expenses and the other being the profit. In addition, because it is an online real estate agency, the increase in the number of users is also an important indicator of business value. This report will list four benefits related to the company's business value as a result of the implementation of 3D scanning technology. This report will list three benefits related to the business value of a company implementing 3D scanning technology. The first more detailed presentation of the property; the second benefit is stronger marketability; the third benefit is the convenience of an online viewing model.

1. More detailed, more vivid property display
The first benefit is that 3D scanning and VR technology can showcase properties in greater detail, giving users and buyers a more realistic and authentic feel. Traditional real estate agency websites typically show buyers or users the property in 2D images or videos and then have staff lead interested users on a site visit. 2D images do not give buyers a concrete idea of the property and may not be of much interest to users. Conversely, a vivid 3D model of a property can provide a significant sensory and experiential boost to the buyer, leaving a more profound impression. (Kun W,2009) Compared to traditional 2D pictures and videos, 3d scanning technology gives buyers a more immersive feeling as if they are in the property they are viewing. 3D scanning and VR technology give buyers a virtual tour of the property, allowing them to visualize various property features, such as the lighting conditions and decor of the house, giving users a more profound impression and a more intuitive idea of the property, they are viewing. A better browsing experience is likely to impress buyers, who are more likely to buy the property, and the company's revenue grows as a result, so the fact that 3d scanning can provide a better presentation of the property is the first primary reason to increase the company's business value.

2. Stronger market competitiveness
3D images of properties and virtual tours are more attractive and impressive to buyers than traditional photos and videos. This functionality is where 3D scanning technology can provide REA with novel features that competing companies' websites do not offer. The use of novel technologies brings additional advantages, and VR technology offers additional commercial value as well as an enhanced user experience. (Construction Week,2020) The 3D and VR viewing feature will impress buyers and create a more professional image for the company while providing a better service. A better impression with customers means that buyers or sellers will prefer to work with REA Group over other companies, increasing the likelihood and number of successful transactions, resulting in more profit for the company. More substantial market competitiveness means attracting more users and building a better reputation,

which boosts REA Group's business value.

3. Convenience for buyers and REA group

Another benefit of the implementation of 3D scanning is the convenience it can bring to both REA group and buyers. The format of most real estate company viewings these days is that the buyer sees the property of their choice on the website and contacts the real estate company, which then negotiates a time for an on-site viewing with the client. This is very inconvenient for buyers who are pressed for time or are far away, and it is also inconvenient for real estate companies who need to send their staff at any time. 3D and virtual reality technologies allow potential buyers to view properties carefully and accurately from the comfort of their homes. (Newstex,2016) The implementation of this technology offers excellent convenience to buyers who live far away or even overseas, thus attracting more overseas buyers to view and transact their homes remotely. This increases the likelihood of a successful and profitable transaction. For REA Group, more online consulting transactions mean no need to hire too many employees for offline activities, reducing employee payroll expenses. 3D scanning technology makes it possible to view properties online, which attracts more overseas buyers, making it more likely that the company will close the deal and make a profit and reduce the amount of money REA spends on staff salaries. In conclusion, these three points of using 3D scanning technology in real estate agency websites contribute a lot to the company's profitability and reduce the amount of money the company spends on employees. In addition, the use of 3D scanning equipment can also save the company the cost of hiring professional surveyors to measure the property. (Mahdjoubi et al., 2013) All these are closely related to the company's business value and can achieve the company's goals.

Project Scoping

The REA Group requires several changes to adapt to the introduction of 3D Scanning technology, which include upgrades, IT infrastructure and system integration of the company. In this section, we explain the details of how the 3D scanning technology application will affect REA Group and the mentioned changes of company.

Upgrade of Company

3D Scanning technology is a completely new technology for REA Group, the company require upgrading of equipment and staff such as purchasing professional equipment and hiring professional staff, in order to ensure the proper implementation of the technology. Firstly, a professional 3D scanner is a prerequisite for the application of 3D scanning technology and the company's existing equipment does not meet this requirement. This technology not only performs digital rendering of the scanned object, but also obtains accurate dimensions. At the same time, the 3D scanner must be able to connect to the Internet and send the scanning results to the company's cloud-based database. Secondly, professional staff can efficiently support the application of technology.
Experienced real estate photographers can produce extraordinary 3D images of property. They have more experience in dealing with issues such as exposure and complications in images and can carefully manipulate and retouch images to provide the best effects. In addition, Senior imaging engineers play an important role in the application of 3D scanning technology in the company. They will convert the 3D point data which provide from 3D scanner into an information model of the property. In general, the company had to upgrade professional staff and equipment regarding 3D scanning technology.

IT Infrastructure

IT infrastructure is the collection of various components required to company's operation and management in the IT environment. A flexible, reliable, and secure IT infrastructure can help company achieve the business goals more efficiently and provides a competitive advantage in the marketplace. The two core components of an IT infrastructure are hardware and software. The hardware includes computers, servers, routers, and various physical facilities and the software include various management systems, operating systems, and web servers etc.

Overall, the REA Group does not need to make changes to the existing IT

infrastructure to support the introduction of 3D scanning technology. There are several reasons. Firstly, the application of 3D scanning technology to provide a 3D virtual tour is a feature which is embedded directly into the realestate website to enhance the visual experience of the customer. This approach is integrating the visualization functions from 3D scanning technology into existing systems the 3D point data generated by the 3D scanning technology will also be stored in the company's existing cloud-based servers. Integration will be covered in the following section. Secondly, The REA group company already has a well-established IT infrastructure. This blog highlights the fact that REA Group has been using google cloud in recent years and that the company is primarily focused on implementing data analytics tools and services on the Google Cloud Platform (GCP) technology stack as well as using BigQuery as the company's multi-cloud data warehouse(Caif 2020). The company's existing IT infrastructure can support the implementation of 3D scanning technology. Thirdly, there are often many potential risks associated with updates to IT infrastructure. One of the major risks is that the new IT infrastructure does not support the business environment. In addition, it requires extensive hardware and software replacement and enormous expenditure (Theis 2018). The benefits of 3D scanning technology should not come with unnecessary potential risks.

Integration

The company will need to integrate 3D scanning technology into the company's existing IT environment. The integration of technology and systems does not need to be outsourced to a software company, the REA group has a complete engineering team, which include developers, UI developers and data engineer etc. Firstly, building information modelling is a complete digital representation of building information such as geometry, appearance, and other characteristics of the measured building(Mahdjoubi et al. 2013, p. 1273). The capture of building information through 3D scanning technology can create a 3D model files. These files are the 3D image of each individual room, our online visualization tool must integrate them to form an overall model of the real estate(join rooms to form a house). By accomplishing this integration, our potential customers can inspect their interested property naturally (reduce customers' effort of learning). At the same time, the 3D model files will be uploaded to the company's cloud-based database. Secondly, UI engineers need to integrate these 3D images into the realestate website to achieve the visualization features.

In conclusion, The REA Group requires a number of changes to adapt to 3D scanning technology. Firstly, company should provide the equipment and professional staff to meet the requirements of 3D scanning technology. Secondly the introduction of 3D scanning technology does not have a significant impact on the company's existing IT infrastructure and finally the company's development team needs to integrate the new technology with existing systems.

Technology Analysis

Technology

The name of technology we used is 3D Scanning which can transfer real objects to digital view and be used for the real estate industry.
3D scanning is a technique used to create high-precision 3D models of real-world objects. This technology can help real estate transactions become more convenient, and the efficiency of uploading or viewing real estate by users can be greatly improved through advanced scanning technology.

Background

3D scanning is a process of analyzing the real objects and collecting all the data in order to create a digital appearance and shape. Laser 3D scanning is the most commonly used 3D scanning technology applied in the real estate industry. Firstly, use a laser-based scanner to digitally capture the shape of the object in property to obtain the digital data. Secondly, a laser point is projected from the device to the object during the scanning and measures the distance to the object by sensor. Thirdly, Users can upload digital images to a cloud database and use 3D visualization software to process these images and generate a panoramic property model with multiple locations for browsing. 3D scanning technology provides an immersive way to view realistic property landscapes.

3D scanning technology will provide various innovative features for the real estate industry to improve the customer online viewing experience.
1.   **3D virtual tour**
Provide a complete and immersive panoramic view of the property which include inside, outside and floor plan views. Firstly, the inside view allows viewers to click the interactive button to move to any area and rotate 360 degrees at a fixed point. Secondly, the outside views allows users to explore and evaluate the overall structure of the property from an external perspective. Finally, the floor plan view provides a top-down perspective to observe the relationship and layout of each room and space.
2.   **Custom content label**
The property owner can insert any kind of specific attribute information in the 3D space of the property including text descriptions, video, and PDF files. This feature helps customers better understand the use and value of specific attributes in the space.

Proposal

Room's 3D model synthesis using panoramic images. Visualize the model on web pages or app interfaces. It will be the first application adopting this technology for the purpose in Australia. While similar application of KE Holdings (NYSE: BEKE) on their platform in China.

This report will also describe the benefits of implementing this technology as well as the potential risks and challenges. This report will first describe some of the benefits of implementing 3d scanning technology. The first advantage is that the application of 3dscanning technology has changed the form of viewing from offline to online, which can bring convenience to users and allow the company's listings to be seen by more overseas customers, thus expanding the company's overseas market.

The second advantage is that compared to just showing pictures and videos of a house, 3d scanning provides users with a virtual tour, giving them a more realistic experience when browsing a house, which can both increase user satisfaction and loyalty when using the site, and attract more users to the website.

There are also risks and challenges associated with implementing this technology. The main challenge is cost, to implement 3d scanning of the house, the company needs professional equipment and personnel to carry out, which will greatly increase the cost of the company.

Process Changes

In this section, we will explain our company's business processes and what changes need to be made to different types of these processes due to the implementation of 3D scanning technology.

Primary Process	Property information advertising, Sales-related data recording, Inspection requesting, Email enquiries sending, Advertising billing process
Secondary Process	Database management process, Security management process, Cloud storage process, website maintenance, Customer relationship management

Management Process	Infrastructure installation, Business culture development

Processes affected by the adoption of the proposed technology

Primary Process

Primary Process change	Property information advertising, Inspection requesting, Advertising billing process

A satisfied customer tends to remain a customer (Gelinas, Sutton & Fedorowicz, 2004). The introduction of 3D scanning technology is to provide potential buyers with more intuitive and convenient access to real estate information, to attract, retain and increase customers. Introduction of new technology provides direct value to customers through the following process changes: Property information advertising, Inspection requesting, and Advertising billing process. In the aspect of Property information advertising, the option of building 3D room tours will be added to the Floorplans and tours section of the advertisement display page of each property. Compared with the simple house floorplan or video shooting of houses provided by other competitors in the market, the 3D room tour function of houses is more intuitive for buyers, and the new function can provide more freedom to browse the details of houses freely. The Inspection requesting process of our website was originally to guide users directly to the information page of the housing agency and then to guide users to leave messages to the housing agency directly. Then, the housing agency will contact the customer for Inspection information. The introduction of 3D scanning technology can provide users with a choice of online inspection before contacting the corresponding housing agency, and guide users to view the above-mentioned Floorplans and tours pages. Through 3D room tours, users can filter properties that do not meet their expectations more effectively. The improvement of this process can greatly save users' time and improve the efficiency of housing agencies. For advertising billing process, because the introduction and deployment of 3D scanning technology will increase the cost of placing real estate advertisements, the real estate agents who choose to deploy 3D room tour functions in real estate advertisements will be charged extra advertising fees. Although the price is higher, the new customers attracted by the 3D room tour feature can bring more benefits to the advertisers (housing agencies).

Secondary Process

Secondary Process change	Database management process Cloud storage process

The introduction of scanning technology supports the primary processes by offering sufficient resources (Aguilar-Savén, 2004) through the following process changes. First of all, the 3D room tour function is bound to expand the scale of the database. Compared with traditional pictures, the storage demand for 3D pictures or models is much larger, and its data format is different from that of pictures. As a result, 3D files may not be directly added to the database, and users cannot browse 3D files directly. Importing new 3D file visualization API tools can make users browse them directly on our web page conveniently. And our database also needs to reserve a table beyond the conventional data space for 3D files. In cloud storage, the server data of realestate.com.au is stored in Google Cloud, which is a typical example of Infrastructure as a Service (IaaS). Google Cloud delivers cloud computing infrastructure, including servers, networks, operating systems, and storage (Brandon, 2012) for our website. However, due to the highly scalable feature of IaaS, the cost premium will not be very high. Therefore, in the end, this new function will charge customers very low.

Management Process

Management Process change	Infrastructure installation

The following changes in the management process control the overall strategy and objectives of the organization (Aguilar Savin, 2004). Our customers do not have the hardware facilities and corresponding professionals to generate real estate 3 D files, so our company needs to purchase the corresponding infrastructure. To implement 3 D room tour functionality, engineers of the company should be able to use 3 D scanning devices properly. Therefore, our company will need to train our engineers or hire new employees (outsourcing) who are skilled. Because of the installation of the initial 3 D scanning tool and staff training, REA Group Ltd may face a short-term budget deficit. However, in the long run, due to the scale effect of new technology applications, the fiscal deficit will gradually decrease.

In this section, we show how 3D scanning technology can help our customers retain customers and save time by changing our company's business processes, including property information advertisement, inspection request, advertising billing process, database management process, cloud storage process and infrastructure installation process.

Risks

Business risk is a factor that companies or organizations must consider, reducing their profits or leading to their failure. Anything that threatens a company's ability to achieve its financial objectives is considered a commercial risk (Kenton, 2020).
In the field of 3d scanning, there are many places to be improved. Therefore, it is necessary to estimate the potential business risks associated when this technology is adopted in advance to prevent and avoid losses possibly.

To use 3d scanning on online house sales more skillfully, real estate companies need to invest in technology. At the same time, many related costs like maintain and update house information timely will also increase. However, spending money on new technologies may bring not only benefits but also bring corresponding business risks. Business risk is affected by many different factors, including consumer preferences, demand, and sales volumes. Perhaps, in essence, real estate transactions are no different from ordinary commodity transactions. However, the fact is, for most consumers, it may not be necessary to check in advance to buy goods online, but buying a house is different. It is not realistic for many customers to decide on a big deal, such as buying a house, only by relying on VR watching. Consumers should consider many factors when buying a house, not only about the type, size, orientation, and decoration style, but also about the location, community support, residential support, surrounding environment, transportation, and other factors of real estate projects (Vasishta and Vasishta, 2020). Therefore, investing and using this technology may not bring high sales, and these investments may bring commercial risks to the company.

Using 3D Scanning for Online Real Estate Platform also has a certain probability of leading to reputation risks. Of course, there is a good experience of viewing the house online. However, due to the late beautification of the digital model house, such as texture mapping, lighting rendering, and color correction lighting, it is suspected of being "beautiful, " making it different from the actual house. For example, some sellers may stitch together panoramic pictures to form an "indiscriminate" 3 d stereo effect and lie to consumers that this is a VR house. In brief, with the current technology, 3d scanning is less "immersive, intelligent and interactive" in the critical interactivity, resulting in consumers having a mediocre experience. It is possible to

blame this mistake on the company, thus damaging the "reputation". Whenever a company's reputation is destroyed, whether previous business risks or different events cause it, it will risk losing customers and brand loyalty (Kenton, 2020). Therefore, it is necessary to pre-consider this impaction and prevent to avoid losses.

The two risks mentioned above and possible case operation risks, one type of business risk, if online real estate marketing by 3d scanning are not carried out responsibly and prudently (Anon, 2020). Operational risk refers to an unexpected failure in a company's day-to-day operations. This could be a technical failure, such as a server outage, or it could be caused by personnel or processes (Blakeman, 2014). For example, when scanning a house with 3d scanning, the information may be wrong, or the best results cannot be displayed due to technical problems or mistakes of operators, which leads to unsatisfactory sales. Not only that, but companies may also have consciously taken precautions and become more cautious when they use 3d scanning to collect house information and display to avoid risk. However, some factors are still difficult to control, such as auditing customers who have the right to see them. Real estate agents must be aware of it. It is a modern world with new technology, which, while making the market more effective, is also vulnerable to criminals and competitors (Anon, 2020). For example, the customer viewing the house now is a competitor, and he may steal information about the house, copy it, and use his website. Therefore, this possibility cannot be neglected. In addition, there may be other operational problems. This series of situations should be considered.

In conclusion, the most important risk to consider is whether the company could generate revenue from the investment on 3d scanning. This is the first consideration for any company that needs to adopt new technologies. Then the next thing to worry about is the probability of credit risks when they use this new technology in online sales because customers are most concerned about the accuracy and authenticity of online house viewing. Whether the houses displayed truly on the platform will directly affect the company's reputation. After considering the above two risks, operational risks should also be considered. Because of the unprofessional skills of employees or sellers, many unexpected failures and problems may result, which will bring business risk and losses to the company.

References

American Banking and Market News: Virtual Reality changes the way buyers view property listings. 3D Scan Experts is the first to offer Real Estate Virtual Reality to home buyers 2016, Newstex Finance & Accounting Blogs, Newstex, Chatham.

Anon, (2020). *Protect virtual home tours against cyber crime | Property Professional*. [online] Available at: https://propertyprofessional.co.za/2020/07/23/protect-virtual-home-tours-against-cybercrime/ [Accessed 22 May 2021].

Aguilar-Savén, RS 2004, 'Business process modeling: Review and framework' International Journal of Production Economics, vol. 90, no. 2, pp. 129–149, doi: 10.1016/S0925-5273(03)00102-6.

Blackman, A. (2014). *The Main Types of Business Risk*. [online] Business Envato Tuts+. Available at: https://business.tutsplus.com/tutorials/the-main-types-of-business-risk--cms-22693.

Brandon Butler 2012, 'Google cloud vs. Amazon cloud: How they stack up: Google recently got in the IaaS cloud market to go up against Amazon, but researcher says the battle is in its earlydays' Network World (Online).

Caif P 2020, 'How Servian helped REA Group repatriate 500TB of BigQuery data', *servian,* web log post, 30 July, viewed 12 May 2021, https://medium.com/weareservian/how-servian-helped-rea-group-repatriate-500tb-of-bigquery-data-f9d42235c3e5

'Can VR real estate solutions be a game-changer?' 2020, Construction Week. https://www-proquest-com.ezproxy.library.sydney.edu.au/docview/1785757316/fulltext/8576C8594BF94CDFPQ/1?accountid=14757

Gelinas, UJ, Sutton, SG, & Fedorowicz, J 2004, Business processes and information technology, Thomson/South-Western, Mason, Ohio.

Kenton, W. (2020). *Business Risk*. [online] Investopedia. Available at: https://www.investopedia.com/terms/b/businessrisk.asp.

Kun, Wang & Zong, Hu. (2009). Application study of virtual reality in real estate

industry.,
http://www.wseas.us/e-library/conferences/2009/ningbo/CD-CEA/CEA48.pdf

Mahdjoubi, L, Moobela, C, & Laing, R 2013, 'Providing real-estate services through the integration of 3D laser scanning and building information modelling' Computers in Industry, vol. 64, no. 9, pp. 1272–1281, doi: 10.1016/j.compind.2013.09.003.

Theis D 2018, 'Updating your IT infrastructure? Did you include risk in your evaluation process?', *expedient,* web log post, 12 December, viewed 12 May 2021, https://expedient.com/knowledgebase/blog/2018-12-12-updating-your-it-infrastructure-did-you-include-risk-in-your-evaluation-process/

Vasishta, J. and Vasishta, J. (2020). *Six Pros and Cons of Virtual Home Tours*. [online] DIRT. Available at: https://www.dirt.com/more-dirt/real-estate-listings/six-pros-and-cons-of-virtual-home-tours-1203319478/ [Accessed 22 May 2021].