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**Management Innovation and Sustainability – Technical
Report**

Approaches to Innovation and Organisational Change

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Executive Summary

This report evaluates a strategic technological change implemented at the Diamond Centre of Wales Ltd (DCW), a bespoke jewellery manufacturing company. DCW transitioned from an outdated SolidScape 3Zpro 3D printer to the advanced ProJet2500W Plus to enhance efficiency in its jewellery design and manufacturing process. The change was initiated in response to increasing printer failures which caused production delays and the need to maintain a competitive advantage through technological innovation.

The change was led using a top-down change management approach, with the manager of the CAD department playing a pivotal leadership role. *Lewin's Forcefield Analysis* illustrated that the driving forces, such as improved productivity, reduced operational stress and higher quality outputs, significantly outweighed the resisting forces, which were largely financial. To assess the effectiveness of the change, *Kotter's 8-Step Model* was applied, revealing that the CAD department effectively created a sense of urgency, engaged the directors and generated short-term wins, leading to long-term benefits which included upskilling opportunities.

Leadership played a critical role in the successful implementation of the change, through a democratic style adaptation by the CAD manager, fostering team involvement and motivation throughout the process. Resistance was minimal, and the team was empowered to participate in the decision-making. The motivation of team members was further analysed using *Maslow's Hierarchy of Needs* theory.

In conclusion, the implementation of the ProJet2500W Plus significantly improved operational efficiency, staff morale and product quality at DCW. While the change was well-executed, future initiatives could benefit from a more structured framework to further streamline the change process.

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1 Introduction

The Diamond Centre of Wales (DCW) is a limited company which specialises in the creation of bespoke jewellery for its consumers. Consumers have an initial consultation with designers where they collaborate on creating a unique design. The Computer-Aided-Design team create a digital rendering of the design to send to the customer. After approval, a wax model is produced using a 3D printer, to be sent to Weston Beamor where they use the wax models to cast the designs in the required precious metal via a process called 'lost wax' casting (Weston Beamor, 2025). The casting is sent back to DCW for completion in the on-site workshop, where the castings are cleaned and polished before the setting of any gemstones. The final piece is then collected by the consumer (Diamond Centre Wales, 2025).

The change that was implemented at DCW was where a ProJet MJP 2500W 3D printer (3D Systems, 2017) was procured by members of the CAD team, to enhance the efficiency and operations of the whole process. The previous 3D printer was a Solidscape 3ZPro (Newman, 2012). Change can be brought to an organisation through the appropriate use of leadership. Leaders with strong leadership skills can motivate employees of the organisation to apply changes which will have positive effects on the company (Hao and Yazdanifard, 2015). Change management is very key in the current day with how rapidly the world of business is changing, with the introduction of new and advanced technologies. Organisations must adapt and alter current procedures to achieve long term sustainability and growth (Kumarasinghe and Dilan, 2021)

2 Main Findings

2.1 Overview of the Change

In the modern day, an organisation needs to adapt and grasp possibilities to ensure it evolves (Ramesh et al, 2024). The market is constantly changing, technology is advancing, and innovations continue to change the way of the working world (van Dam, 2009). Rapid prototyping is an essential part of the process in the jewellery industry, allowing for rapid production of 3D models for precious metal casting. Modern printers provide extreme intricacy and speedy printing, which improves the production time and quality of the final piece (Wannarumon and Bohez, 2004). 3D printers are constantly improving, so, it is vital that organisations consider upgrading their technology to keep ahead or at least keep on the same level as their competitors. They are required to act swiftly to deliver unprecedented quality in their service and products (Onuh and Yusuf, 1999).

The changing of 3D printers for rapid prototyping was initiated by the manager, in what is referred to as a 'Top-Down' change, in which the manager relied on his employees to realise the organisational change (Heyden et al, 2017). Due to the frequent failures, slow output and limited capabilities of the old 3ZPro printer, it was time for an upgrade. With the 3ZPro seemingly coming to an end of its life, this presented an opportunity to search the market for an improved machine. After a discussion with the employers about the concerns, the green light was given, after some resistance, to procure a new advanced 3D printer which would help to improve the efficiency of the department. After researching the market, it was decided that the ProJet MJP 2500W was the best fit for the company due to its extreme speed and precision whilst having a much larger print bed than the old printer, which allows for more models to be printed in one go (Keane, 2023).



Figure 1 Photo of the ProJet MJP 2500W 3D printer at the DCW (photo courtesy of author)

Lewin's Forcefield Analysis is used (*Figure 2*) to show the driving forces for the change along with the resisting factors. According to (Dominic, 2021) this tool helps employers analyse a proposed change and helps them to make informed decisions. Lewin's model's value is enhanced when applied with depth (Swanson and Creed, 2014). However, as mentioned by (Kankaras et al, 2020), the driving and resisting forces are manipulated by the experts which could result in distorted results.

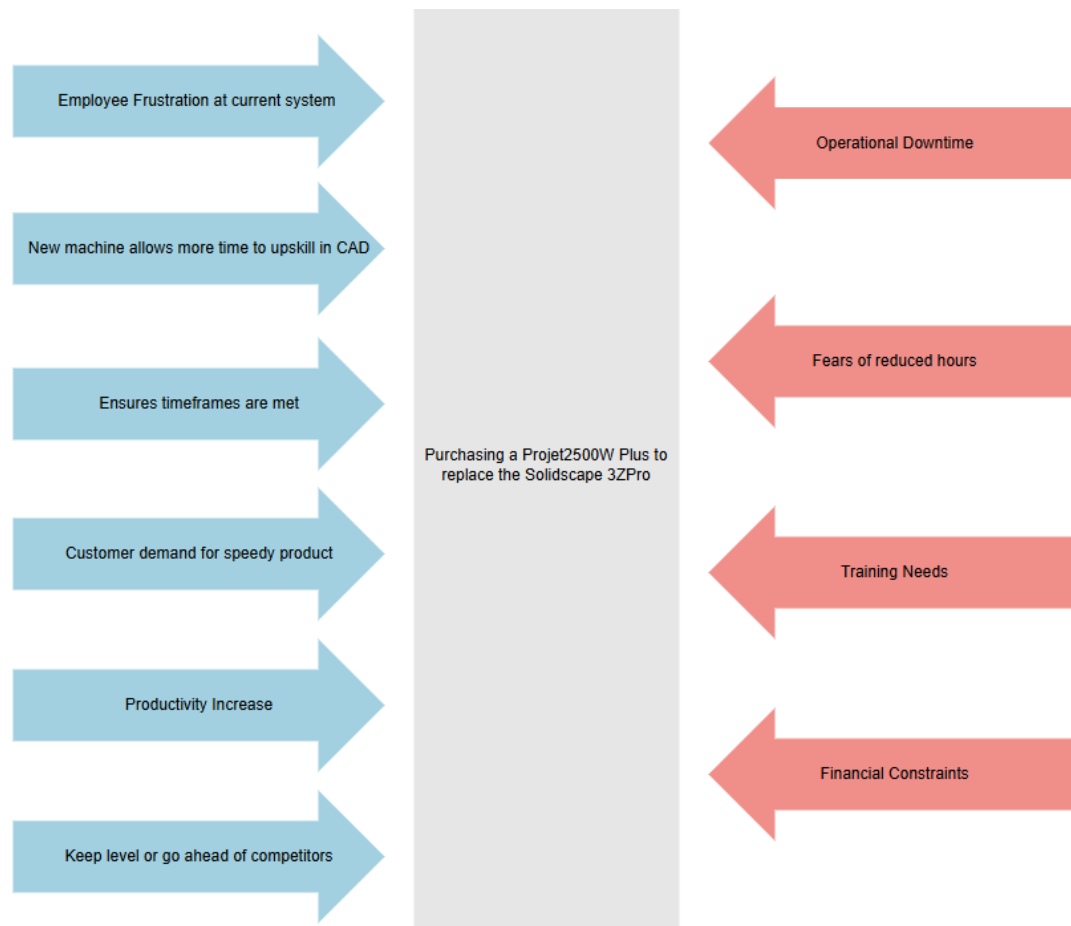


Figure 2 Lewin's Forcefield Analysis used for the changing of 3D printers at DCW (Visual Paradigm Online, 2025)

The driving forces clearly outweigh the resisting forces, which led to the employers agreeing to the purchasing of the ProJet MJP 2500W. The old printer caused delays to the entire process through failed prints and operators spending more time fixing the machines than creating CAD models for customers, resulting in disgruntled employees. This also led to jobs being processed into the workshop with little time to spare before completion dates and added stress as there was little to no room for error for the goldsmiths. Some customers even received their completed product passed the agreed timescale. The time saved from not having to tend to the 3ZPro also enables the operators to upskill in their other roles such as Photoshop skills and CAD skills. By changing to the ProJet, DCW can keep up or stay ahead of competitors with the latest technology in the market.

2.2 Assessment of the Effectiveness

To assess the effectiveness of the change, Kotter's 8-step model will be used. The 8 stages of Kotter's model are: Creating a sense of urgency, forming a coalition, creating a vision, communicating the vision, removing barriers, generating short-term wins, sustain acceleration and institute change (Carreno, 2024). Kotter's model is recognised as one of the best approaches to organisational change management (Pollack and Pollack, 2014). Kotter's model has leadership at the heart of his model, which is split into three different areas – creating the climate for change, making the change happen and sustaining the change (Aldemir, E 2010). However, there is no clear step-by-step implementation guidelines in the model, which can leave it up to interpretation of the users (Ramasamay, 2017).

At the DCW, the first step of creating an urgency occurred in the CAD department from the manager and operators, as they all agreed the 3ZPro printer was causing disruptions to the process and nearing a point that the business wouldn't be able to function with the machine faults becoming more frequent.

The CAD department held a meeting, led by the manager, where they discussed how they would like to proceed with making the change. It was decided that a meeting would be held with the directors, to give the go ahead to the two main machine operators on procuring a new 3D printer for the CAD department. The vision that was created, was that they wanted a top of the range 3D printer that would vastly increase productivity and product quality, whilst allowing the team to focus on upskilling in other areas of their work, such as CAD designs of jewellery and photoshop skills.

The next step was to share the vision with the directors. A meeting was held with the directors where the CAD manager imposed the urgency of upgrading the machine to keep ahead of competitors and enhance the skills of the CAD team. He also told them how he wanted his two team members to lead the procuring of the new printer as they were the ones who used them the most and knew what would be best to look for whilst also giving them further responsibility. The directors agreed with everything that was translated to them.

After the procurement was performed by the two CAD members in charge, they decided on a ProJet MJP 2500W and relayed this to the manager. The manager then took this to the directors who were happy to proceed but only when the budget allowed, which delayed proceedings slightly. As soon as the necessary funds were available, the ProJet was purchased and replaced the old system.

The early benefits of the new machine were visible, creating short-term wins for DCW. The training was extremely simple and took less than an hour to show the new software that allows you to send STL files to the ProJet. After that, you just need to press the play button on the machine for it to

print. The trainer showed the team how to remove the print bed, change the material when required and how to run system diagnostics when necessary. This took less than half a day. The print bed allowed for a high volume of models to be printed and extreme speeds, meaning the printer could be used multiple times a day, increasing efficiency instantly. The castings that were received after sending off the new models to the casters were of a higher quality than previously.

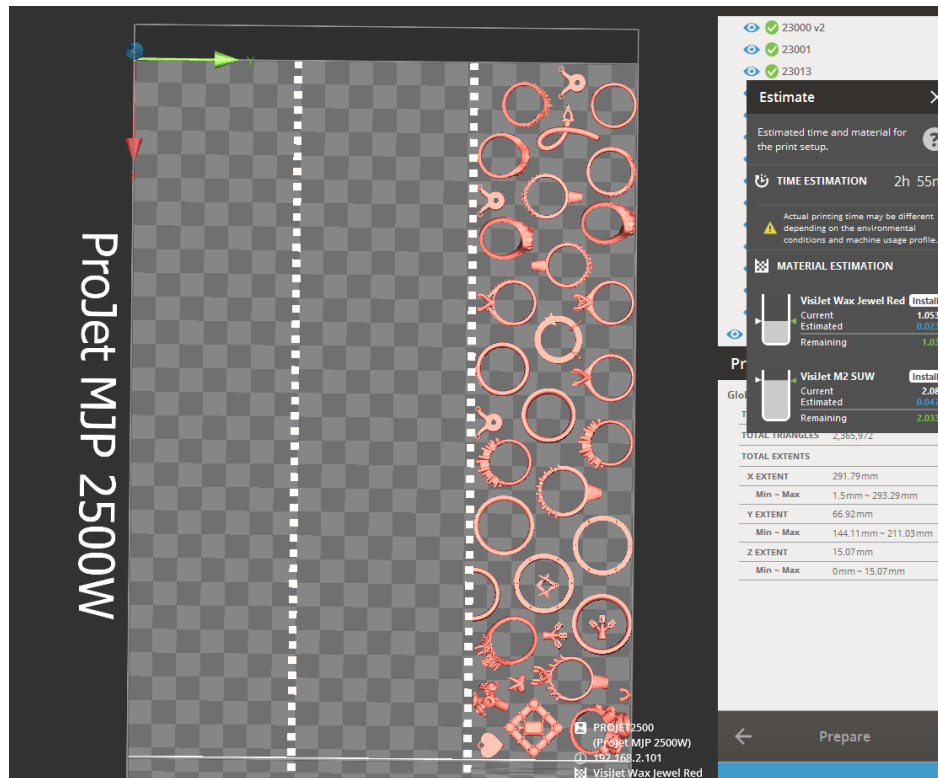


Figure 3 Screenshot from 3DSprint software, showing a high volume of models about to be printed in an estimated time of under 3 hours (courtesy of author)

After installation, there was further acceleration due to so much time being freed up for the CAD operators, that they could then dedicate their time on upskilling in other areas of their work. Each member was dedicated 4 hours of Photoshop training and CAD training per week.

It was agreed with the directors and the CAD department that in the future they would not allow the 3D printer to get in such a dire state before acting on it and that they will keep an eye out on the current market for the latest technologies available which would enhance the workplace efficiency.

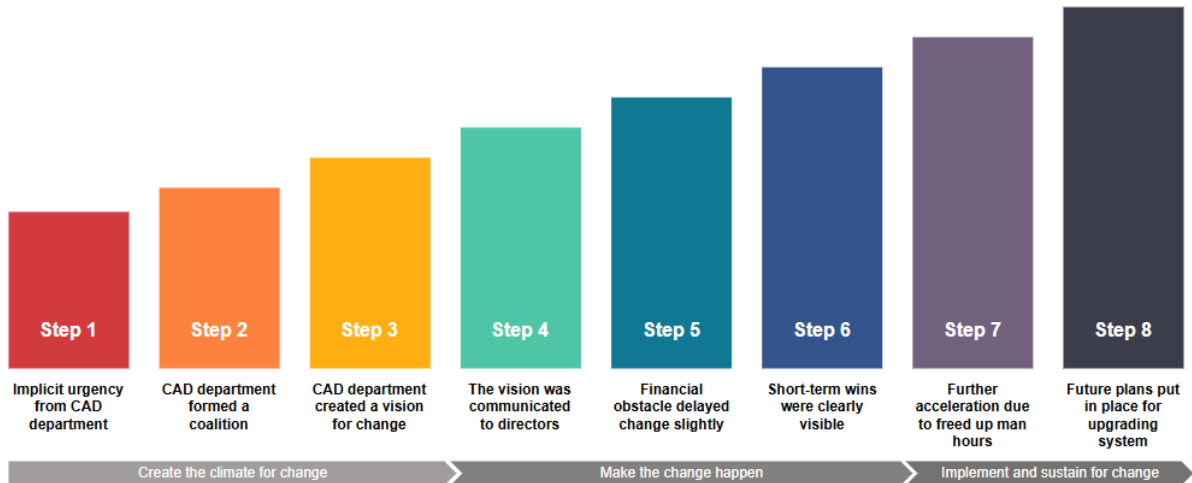


Figure 4 Kotter's 8-Step Model applied at the DCW in the changing of 3D printers (Visual Paradigm, 2025)

Following Kotter's model was ultimately a success for the DCW, but in future they could benefit from a more structured approach to the change that took place.

2.3 Leadership and Management

Resistance to change is a common theme in organisations from both the employee and the organisation itself. Some of the forces for resistance according to (Mullins, 2016) include: insufficient information, fears of job security, de-skilling of work, decreased job satisfaction and change to work structure. Or it could be simply down to individuals happy in their current situation, free riding, not wanting to alter anything in their working life (Damawan and Azizah 2020). Fortunately, in the change at DCW, the resistance to change was very minimal as everyone agreed that the 3D printer needed upgrading. The only resistance was due to financial constraints. To combat resistance to change, managers need to be strong leaders. Leaders need to define goals and objectives, communicate their visions and design and implement structure (Gutterman, 2023). They must also build trust, inspire and motivate their team (Sisonke, 2021).

The CAD manager at DCW has an action-centred leadership approach, where he successfully integrates task needs, team maintenance needs and individual needs (Mullins, 2016). There are three main leadership styles: autocratic, democratic and laissez-faire (Jaafar et al, 2021). As stated by (Chukwusa, 2018), an autocratic leader never allows staff to make decisions. They assume that staff are lazy, untrustworthy and irresponsible (Amini et al, 2019). Nevertheless, an autocratic leadership style is important in critical situations where rapid action is required (Khan, 2021). According to (Sharma et al, 2013), a democratic leader encourages participation in decision-making, offers

guidance and allows input from subordinates. Democratic leadership aids the decision-making of the group through distributing responsibility whilst aiding and empowering the members (Gastil, 1994). Although, democratic leadership can have a negative impact on team members, such as given them increased challenges and responsibilities that can become a burden (Wang et al, 2022). Laissez-faire leadership is a hands-off approach where the leader has minimal involvement; allowing subordinates to make the decisions (Bwalya, 2023). This approach is described as the leader exerting minimal effort to get tasks done and shows a lack of leadership (Ekmekci and Tosunoglu, 2016). This approach to leadership hinders productivity and diminishes motivation (Kamal et al, 2024). The CAD manager during the changing of 3D printers at the DCW adopted a democratic approach, whereby he involved his team members during the whole process of the change, whilst motivating them to lead the procuring of the new machine.

Motivating team members is a key role of a leader. Maslow's motivational theory: 'Hierarchy of Needs' is a widely used tool in management. Maslow stated that people have biological, physiological and social needs that need to be satisfied (Uysal et al, 2017). There are five specific levels of needs in Maslow's theory: physiological, security, recognition, esteem and accomplishment (Taormina, 2013).

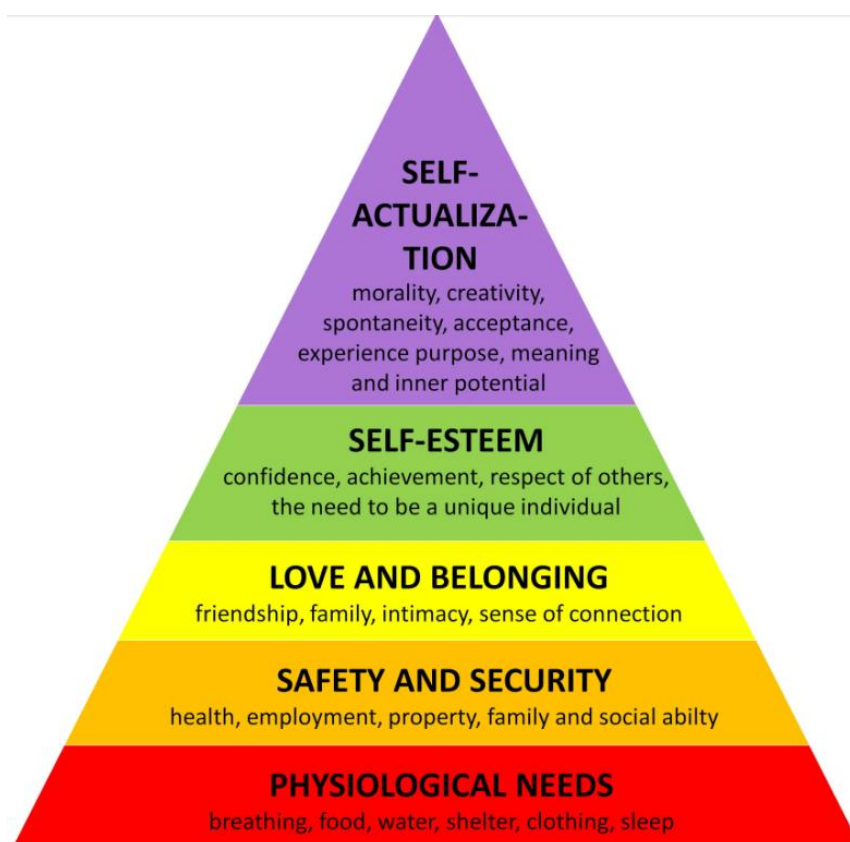


Figure 5 Maslow's Hierarchy of Needs (McLeod, 2025)

The main idea of the theory is that the needs at the lower level of the pyramid need to be satisfied before the higher levels can become motivators (Bitesize Learning, 2024). The physiological needs are the basic needs that people require to sustain life, which includes food, shelter, clothing and sleep (King-Hill, 2015). This forms the base of the pyramid shown in (*Figure 5*). Next is the safety and security needs, which refers to the need for things such as health insurance, job security and safety from physical danger (Van Reisen, 2016). Following on is the social needs that individuals desire, such as feeling belonging to a group which accepts them with love and affection (Trivedi and Mehta, 2019). The next level up is the self-esteem needs, where Maslow states that people need to sense that are valued by others, gaining respect and appreciation. Satisfying these needs tends to give people confidence in their abilities (Cherry, 2024). At the top of the pyramid (*Figure 5*) is self-actualisation which becomes a motivator once all the other needs have been satisfied. Self-actualisation is when a person fulfils their full potential (Montag et al, 2020).

3 Conclusion

The change implemented at the DCW, upgrading from the Solidscape 3ZPro to the ProJet MJP 2500W 3D printer, serves as a strong example of effective organisational change driven by technological advancement and strong leadership. The decision, although initially met with a financial boundary, was well-received due to a clear vision that was well communicated by the CAD department. The application of Kotter's 8 step model helped structure the change process, highlighting the importance of urgency, vision and short-term wins in securing long-term improvement. Furthermore, the democratic leadership approach of the CAD manager empowered employees and encouraged engagement which led to increased motivation and professional development within the CAD team. The transition was smooth due to minimal resistance and clearly defined goals. The change has already yielded significant benefits through the efficiency, product quality and workforce capabilities that the ProJet MJP 2500W has enabled. Going forward, DCW is now better equipped to sustain innovation by keeping up with technological trends and maintaining a responsive, democratic leadership style. The change has strengthened the operational functioning of the company whilst reinforcing the value of aligning strategic decision-making with employee development and customer satisfaction.

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