



School of Engineering MSc Mechanical Engineering

Leadership Innovation and Product Development
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Assignment – Innovative Approaches

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Abstract

The investigative report considers the sources of innovation open to the Kodak Eastman company, and the effects of failure to innovate which ultimately led to bankruptcy. Kodak was initially displaced from the market due to failure to react to disruptive innovation, however, the whole sector is under threat from radical innovation entering the market in the form of the smartphone. The report considers the coexistence of innovation and Lean, and the change management models used in the process of organisational change.

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1.0 Introduction

The Kodak Eastman company were an innovative company that held a leading position in their market for a period in excess of 100 years. The investigative report considers the sources of innovation open to the organisation, and analyses the effect of disruptive, incremental, architectural and radical innovation with respect to the organisations market position and ultimate demise. The simultaneous application of Lean management and innovative change is evaluated in terms of its suitability to different sources of innovation. The management of change within an organisation is evaluated with respect to failure.

2.0 Sources of Innovation

The definition of Innovation when applied to product development within a business reaches further than the dictionary definition; *(the use of) a new idea or method*. Indeed, the highly respected management consultant Peter Drucker describes the process of innovation as a systematic process of analysing seven sources of innovation for an innovative opportunity. In *Innovation and Entrepreneurship* (Drucker, 2012) the seven sources of innovation are classified into two groups, those that are found within an organisation or industry, and those that are outside.

Within an Organisation or Industry

The first four sources of innovation found within an organisation or industry are described as symptoms by Drucker (2012) and are considered as reliable indicators of change.

1. The Unexpected – ‘*The Unexpected Success*’, ‘*The Unexpected failure*’, ‘*The unexpected Outside Event*’. Management within an organisation often find difficulty in accepting the unexpected, as it often goes against the established norm. However, by applying systematic analysis the unexpected can often be exploited.
2. Incongruities – The difference between the actual reality of an organisation and that which it is assumed to be.
3. Innovation Based on Process Needs – Identifying areas of an existing process where improvements can be made.
4. Changes in Industry or Market Structure – Influenced by changing desires of customers.

External to an Organisation or Industry

5. Demographics - Considered as a reliable predictor of future opportunities for innovation.
6. Changes in Meaning and Perception - An organisations customer base changes over time with respect to how they view life and feel about things, failure to identify and adapt to changes and perception can lead to a product or service becoming outdated and irrelevant in the market.
7. New knowledge – ‘*Scientific and non-scientific*’. As new technologies become available so follows the opportunities for innovation. However, of all the sources of innovation, new technology can be the slowest to in providing opportunities. Drucker (2012) comments that this is often the most high-risk approach resulting in few innovative opportunities due to high failure rate.

However, the lines between the seven sources of innovation are not clear cut, Drucker (2012) comments that the lines often overlap, and no area is more important or productive than another. Although each should be subject to separate analysis.

3.0 Innovation and the Kodak Eastman Company

The report investigates the types Innovation that the Kodak Eastman company were exposed to and utilised in the period until their bankruptcy in 2012.

Disruptive innovation

Applies new technology and processed to an existing market.

The concept of disruptive innovation was described by Bower and Christensen in the article Disruptive Technologies: Catching the Wave (Bower & Christensen, 1995). Disruptive innovation effects established organisations where their focus is on their customer base which provides the highest return, and their current business model neglects the lower end of the market often due to low value and returns, the focus on the higher end of the market provides opportunities for a disruptive innovator to enter the market at a lower point often overlooked or ignored by the bigger organisation. Christensen cautions against perceived best practices of listening to the customers' needs, productivity and continuous improvement as a route to being affected by disruptive innovation (Christensen, 2016) which is often the driver in satisfying demanding high value customers.

The failure of the Kodak company leading to bankruptcy in 2012 provides a classic example of an organisation that failed to adapt to disruptive innovation. Kodak held the forefront position in photography for over 100 years, indeed from its conception, 1889, Kodak was an innovative company bringing many film and camera products to the market which disruptively displaced other companies, by the 1970's Kodak's share of the market accounted for 85% of cameras and 90% of film (Brand minds, 2018). However, Kodak's focus was on the film and film camera business, they had invented the digital camera in 1970, but chose not to take to market due to the belief that it would disrupt the existing film and camera business. The view held by Kodak was that it was in the film business, not in the business of making memories and storytelling (Forbes, 2012) , the opportunity to exploit the digital camera and the ability to instantly share images was missed (Lucas & Goh, 2009)

The disruptive opportunity was taken by Canon and Sony in the late 1990's, while Kodak was still focusing on its film business. With both Canon and Sony investing heavily in digital camera technology, Kodak did not make a significant push to enter the digital camera market until early 2000's by which time the damage had been done (Techcrunch, 2012), Kodak could not recover its market position as detailed in figure 1, where Kodaks shipments of Digital Stills Camera (DCS) and net sales is seen to significantly decrease and

stagnate respectively. Initially the digital camera technology had not matured, Kodak did not see this as a risk as initially analogue film was of superior image quality.

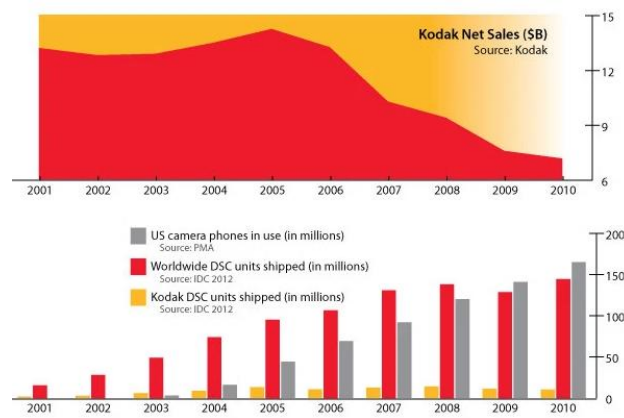


Figure 1. Kodak's net sales and DSC units shipped 2001 -2010 (Techcrunch, 2019)

Whilst Kodak's failure can be attributed to disruptive innovation as discussed; the root cause can be further analysed in terms of failing to acknowledge the sources of innovation described by Drucker. Kodak failed to identify and react to innovation opportunities, these being; changes in Industry or Market Structure and Changes in Meaning and Perception, by not aligning their business model to align with the digital revolution and relying on the belief that their customer base would remain with brand and technology loyalty. And ironically, the highest risk innovation New knowledge through the rejection of the digital camera over an existing product (Satell, 2017).

Grant and Baden-Fuller (2003), suggest that a further problem experienced within Kodak during the digital transition was upset of the congruity which existed between the respective knowledge domains and products. Arguably this was another indicator missed by Kodak which aligned with an internal source of innovation, Incongruities described by Drucker (2012).

Perhaps the adoption of the approach taken by Hewlett-Packard with respect to managing the disruptive introduction of ink jet printer technology in a business dominated by laser printing technology, notably itself responsible for the disruptive displacement of dot matrix print technology, would not have been lost on Kodak. Christensen (2016), describes how Hewlett-Packard devised a separate business organisation to develop, expand and exploit the emerging ink jet printer market. Ultimately Hewlett-Packard allowed both business organisation to compete against each other competitively.

Christensen (2016), comments that although the inkjet printer may not be as good as the laser jet printer. The critical question that should be asked is whether the inkjet printer is as good as the market demands.

Kodak had not considered if analogue film technology met the market demands with a disruptive new digital technology emerging. Ultimately for Hewlett-Packard one business may displace the other, however an amount of security has been established by committing to both technologies.

Incremental and Architectural Innovation

Incremental - Utilises existing technology and increases value by adding new features within an existing market.

Architectural - Transferring existing technology and methods from an existing market and applying to a different market.

Whilst Kodak lost the opportunity of exploiting new digital camera technology in the 1970's, Canon took an incremental approach to camera design, introducing microprocessor control in 1976 followed successively by further incremental improvements in the form of automated focusing, exposure and flash control (Zelten, 2002). The incremental adoption of New Knowledge allowed Canon to improve their camera design incorporating improving digital technology whilst still primarily a film format camera supplier, whilst not always successful Japanese organisations excel at process innovation (Griffin, 2012), by focusing on process innovation Canon also increased quality while reducing costs. Overall that put Canon in a position where migration from film to the fully digital camera was in effect another incremental step. This was certainly a contributory factor of Kodak's demise, as they entered the digital market later in a position of catch up, from which they were unable to recover.

Whilst Japanese manufacturers took an incremental approach to improving the film camera, Kodak were faced with task of replacing the core element of their business analogue film and replacing with digital technology. To facilitate this transition Kodak employed an architectural innovation approach (Pisano, 2015), which utilised their existing network of film process facilities and retail outlets. Kodak believed that the transition from analogue film to digital imaging would be an evolutionary change rather than revolutionary, and that digital aspects could be introduced alongside existing analogue film technology.

Kodak introduced digital image manipulation to its retail network in 1998, this was followed by self-service machines in 1994. The concept allowed the digital edit of images allowing crop, zoom and red-eye reduction. But crucially for Kodak the facility to print a copy of the edited image in line with their core beliefs. (Grant, 2016) By 2004 Kodak was the established leader in digital printing self-service machines, with in-excess of 55000 distributed globally. In 2001 Kodak released its *EasyShare* system, which allowed the consumer to upload existing analogue formats and new digital media. Within the system the image

could be edited, shared, or printed by three separate means; professional processing, retail self service machines and home printing.

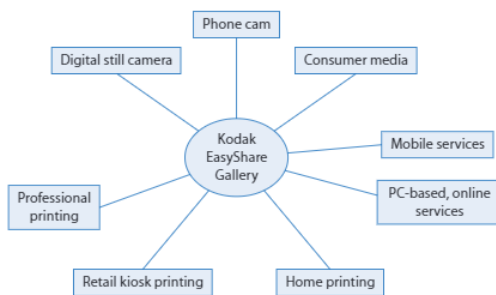


Figure 2. Kodak's EasyShare Network (Grant, 2016)

However, by 2001, the decline in analogue film sales and shift from analogue to digital cameras had already taken hold and revenue was in an irreversible decline as illustrated in figure 3. Kodak had failed to identify and act on customer insight.

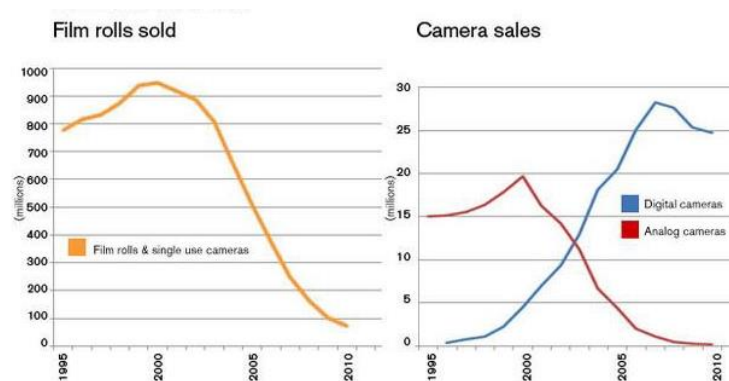


Figure 3. Decline of analogue film and camera technology (Medium.com, 2019)

Radical Innovation

Applies new technology and processed to an existing market.

The biggest upset to the digital camera and analogue film industry was the radical innovation of the modern smart mobile phone starting with the iphone, the consumers perception and meaning as described by Drucker (2012) as a source of innovation clearly set by the expectation of consumers, there being a clear shift from printing physical pictures to sharing over the internet. Kodak failed to innovate, to identify the *new* business, sharing of pictures over the internet, not the expansion of its existing analogue film business (Lucas & Goh, 2009). Not only could the consumer share a picture over the

internet, the facility to add the location in real time also allowed the consumer to build and share a story, not just a picture.

The uptake of smartphones has been phenomenal, with a massive increase in sales, while the digital camera market continues to retract as illustrated in figure 4.

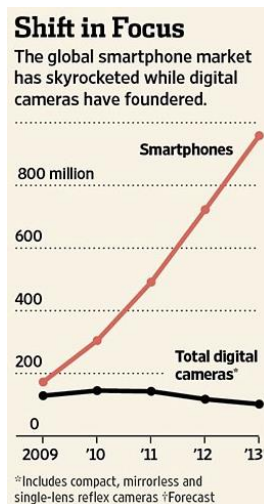


Figure 4. Smartphones vs Digital cameras (Medium.com, 2019)

The future of the digital camera in the face of the smartphone appears bleak, whilst smartphone sales had dropped to 400million globally in 2018, the number of digital cameras sold was 19 million (Hornyak, 2019). In the same period, of Japan's major digital camera manufactures which includes Canon, only one achieved a profit and grew, Sony.

Ironically Kodak entered the market with a disruptive innovation, the roll film and compact camera, which brought photography to the masses and displaced professional studio based activities into a niche market (Grant, 2015). The application of radical innovation requires defined vision and strong leadership to overcome an adverse culture which is likely to result of such innovation.

4.0 Innovation and Lean

Whilst Kodak struggled and ultimately failed to implement change through innovation and fully embrace the digital revolution, they were successful in adapting Lean management principles across its manufacturing, processing and supply chain business units (Altekar, 2012). The engagement within the organisation being successful to the point that they developed their own interpretation of Lean in 1998, the *Kodak Operating System (KOS)*.

Lean management is viewed as a systemic process of waste reduction and cost control, which pulls in an opposite direction to that of innovation. Browning and Sanders (2012) proposed a set of 5 caveats that should be considered when implementing lean and Innovation simultaneously, as innovative activities add rather than remove processes. And that both waste and value are not associated with separate steps, instead they should be considered how they work together adding value, or waste when failure occurs.

Five Caveats to lean Implementation

1. Implement Lean at a time of least disruption
2. Understand the complexity of a system before attempting to improve it
3. Do not improve a process or activity in isolation
4. Reconceptualise value and waste
5. Do not push Lean to the point of negative returns

A study of the coexistence of Lean and Innovation discussed by Zarzycka, et al. (2019) suggests that by applying levers of control management can reinforce employee's belief in both innovativeness and standardisation. Chen and Taylor (2009) add that applying lean or innovation in isolation results in a smaller gain than where both are successfully applied simultaneously.

The appropriate application of Lean in an organisation undergoing a period of innovative change with respect to the four types, described in figure 5, are likely to be viable for architectural and incremental

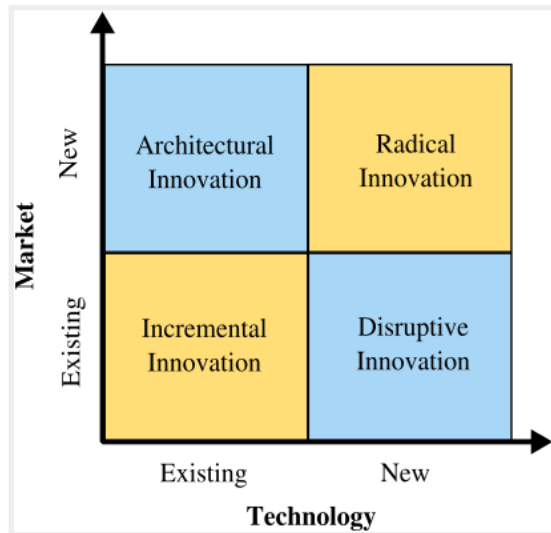


Figure 5. Types of Innovation applied to Technology and its market (Techblog, 2019)

innovation when considering caveats 1 and 2 of Browning and Sanders proposal. As both would be within the scope of an organisation due to the understanding of the technology and slow nature of the innovative process for these types. As radical and disruptive both have an element of unknowns it would be unlikely that lean and innovation would exist simultaneously within an organisation without proceeding with an acute awareness and implementation of change management.

However, should the organisation successfully undergo and apply radical or disruptive innovation the rewards in terms of market share and profit can prove significant as discussed by Chen and Taylor. Considering Kodak's early successes during the 1970's with respect to market share, and sales in excess of 10 Billion US Dollars in 1981 (Brand minds, 2018), it clearly had the ability to be both innovative and Lean.

5.0 Change Management

Organisations are faced with considerable challenges brought about by innovation, both internally and externally, which affect their competitiveness in the marketplace. Whilst change is constant, the difficulty for any organisation is identifying the change and following it (Bold, 2011). In addition to identifying the change, a change of attitude is also required for successful implementation, therefore the leadership of an organisation is instrumental in facilitating change (Dobrea & Gaman, 2011).

When change is required within an organisation a process is started that contains many phases, each of which is of critical importance in achieving the desired outcome. Kotter (1995) sets out an 8-step model for change which primarily focuses on the people of the organisation. Additionally, Kotter describes 8 errors that contribute to the failure of an organisational change, highlighting that critical mistakes can be made in any of the phases which are likely to have a devastating impact on overall success.

Error 1 – Not Establishing a Great Enough Sense of Urgency

Kotter suggests that over 50% of organisations fail in the first phase. The clear communication of information across all the organisation with respect to the desired change either a crisis or opportunity must install a sense of urgency. Effective leaders are required, not just managers which are conversant with existing systems.

Error 2 – Not Creating a Powerful Enough Guiding Coalition

The team driving change must include senior managers, and other key stakeholders that are not at senior management level within the organisation, or even external to the organisation. Strong leadership of the team must be present to install a sense of urgency and promote teamwork.

Error 3 – Lacking a Vision

A clear vision is crucial in setting out an organisation's transformation. It must not detail a list of projects or objectives that are unclear and confusing. Failed organisational transformations contain plans, but no vision.

Error 4 – Under communicating the Vision by a Factor of Ten

The guiding coalition does not clearly communicate the vision and change, this could be as a result of only making one announcement to the organisation and not following up with further communications. Also, total commitment is required from all senior members of an organisation, failure to project a unified position can lead to cynical views and positions developing in other parts of the organisation.

Error 5 - Not Removing Obstacles to the New Vision

Successful communication encourages others within the organisation to embrace change, however obstacles can be present which restrict progress. This could be due to the existing structure within the organisation, where the job description can be an obstacle in obtaining objectives, or middle management undermine the organisational change.

Error 6 – Not Systematically Planning For and Creating Short-Term Wins

Organisational change can take a considerable period of time to complete. The drive to complete the change can slow or stop if no results are seen within the organisation. This may require the setting of short term results which are achievable, thereby giving the organisation an opportunity to reward its people and further communicate the success in driving change forward.

Error 7 – Declaring Victory too Soon

Change within an organisation's culture can take a considerable period to become established and adopted. During the period of change the organisation is vulnerable to regression initially, therefore it is imperative that the focus is maintained by the guiding coalition.

Error 8 – Not Anchoring Changes in the Organisation's Culture

Unless people are shown how the change has improved the organisation it is unlikely to be fully adopted into the organisation's culture. This applies equally to new people entering the organisation both at an operating and management level.

The importance of managing change and people to avoid the eight errors of failure is reinforced by Kotter's view that due to relatively little experience in driving change within an organisation even the most capable are not exempt from making errors.

Kotter's 8 step model is very much a strategic approach, which is driven by the guiding coalition from the top down, this approach is dependant on clear communication of the organisation's vision (Rajan & Ganesan, 2017) and the understanding and implementation of feedback received. The success of implementing step 4 and 5, Communicating the Vision and Empowering Others to Act on the Vision respectively, are critical steps where senior managers often perform poorly or fail. However, correct implementation through clear communication, will bring those on board which at first are obstructive to change, individuals crave to be part of a winning team (Rajan & Ganesan, 2017).

Another change approach which takes on a holistic view of the organisation is the McKinsey 7S framework, where the organisation is viewed as 7 interrelated elements. Importantly all elements are considered equal. The seven elements being separated into two groups, soft and hard.

Soft Elements

- Skills
- Staff
- Style
- Shared Values

Hard Elements

- Strategy
- Structure
- Systems

Each of the elements must be in alignment for success, however as all elements are interrelated a change in one is likely to influence all other remaining elements.

The McKinsey 7S framework allows a comprehensive understanding of the organisation to be developed at all levels due to interrelated and holistic nature of the method. However this is very much based on the flow of information and communication as pointed out by (Singh, 2013), information and communication can be formal or informal, and flow one or either direction. The framework allows a comparison of the desired and present condition of an organisation.

6.0 Conclusion

The rise and ultimately the demise of the Kodak Eastman company highlights both successful and unsuccessful implementation of innovation and change. Whilst initially the company embraced disruptive innovation through the introduction of roll film technology, the downside of disruptive innovation became clear where a separate strategy required implementing and accepting that profits may not materialise as quick as shareholders would hope, perhaps the driver for the successful application of Lean techniques.

The role of senior management in driving incremental and architectural innovation cannot be underestimated, whilst both strategies had performed well for Kodak there were errors made with respect to customer insight, whilst they were able to apply and develop their existing technology. They lost sight of changes in both industry and more importantly meaning and perception of their customer base. Opportunities were lost in implementing change management, certainly with respect to Kotter's 8 errors.

Kodak held firm in their core belief that they were in the business of creating pictures, not creating memories and storytelling. Kodak's vision and in turn leadership were not focused on innovative change which resulted in their displacement from the market. They had failed to acknowledge and act on the sources of innovation as set out by Drucker.

Ultimately for Kodak, and other digital camera manufacturers such as Canon, the radical innovation of the smartphone has proved the biggest upset of all to the camera business. The smartphone capturing both a new market and a new technology, combining a camera within a device that allows the customer to tell and share a story.

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