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## **Surviving Disruptive Innovation**

Does Incumbent Size and Strategy Matter?

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# **SURVIVING DISRUPTIVE INNOVATION:**

## **DOES INCUMBENT SIZE AND STRATEGY MATTER?**

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### **ABSTRACT**

*This paper explores how size and strategy of incumbent firms influence their ability to respond to disruptive innovations. By conducting an in-depth case study of Hasselblad, a manufacturer of professional cameras, this paper explores how firm size and strategy affect the possibilities for incumbents to manage disruptive innovations. It can be seen in this case study that Hasselblad's limited resources and its niche strategy affected how it managed the transition from analogue to digital camera technology. Despite early initiatives to develop internal capabilities in digital imaging, top management eventually stopped these efforts to focus only on the established mechanical technology. The owner at this stage had a clear short term focus and the limited long-term investments did not allow for the development of both established and new technology, but only the former was pursued. The firm's focus on the high-end segment of the market made it difficult to allow experimentation with digital technology in the main business, as this technology at the time had too low performance to satisfy the demanding customers and thus could potentially harm the brand image. The firm thereafter pursued collaborations with firms developing digital technology without success. Being close to bankruptcy, the digital resources needed were eventually acquired and the company managed to survive by developing competitive products with digital technology. In conclusion, this paper argues that the heterogeneity of incumbents has not been sufficiently addressed in previous literature and that an established firm's resources and strategy need to be taken into consideration when addressing how disruptive innovations should be managed.*

*Keywords: Disruptive innovation, technology, digital, camera, incumbent, acquisition, strategy, size.*

## 1. INTRODUCTION

The concept of disruptive innovation has recently received much attention from both academics and practitioners. Over time, the focus of this area has shifted from ex-post descriptions of how technologies can disrupt existing industries and firms to more proactive and management-oriented questions. Nevertheless, there are several areas that so far have been insufficiently explored. One such aspect is the heterogeneity of incumbents. It appears reasonable that the capacity to respond to disruptive innovations depends largely on the characteristics of the incumbent and consequently that the managerial solutions proposed need to take these differences into consideration. This paper explores how the size and strategy of incumbents influence their ability to manage disruptive innovations. It argues that previous literature on disruptive innovation has downplayed the heterogeneity of incumbents and that this term needs to be nuanced further.

Literature about discontinuous innovations distinguishes between incumbent firms and entrant firms. Much scholarly attention has been focused on how and why incumbents encounter problems when exposed to discontinuities (e.g. Tushman and Anderson 1986; Christensen, 1997). While the literature on disruptive innovations has proved that incumbents frequently fail in the transition from a sustaining to a disruptive technology, it has shown limited interest in the differences between incumbents. In the discourse regarding disruptive innovation, incumbents are often treated as one population vis-à-vis entrants, rather than as many populations with different resources, market positions and strategies. Contrary to this, it appears reasonable that the solutions to the innovator's dilemma, depend upon the firm's strategic contingencies. By not making a distinction between different incumbents in terms of resources and strategy, we run the risk of missing out important aspects of disruptive innovations. Consequently, in order to provide fruitful managerial solutions to disruptive innovations we need to address this heterogeneity. By conducting an in-depth case study of Hasselblad, a manufacturer of professional cameras, this paper explores how firm size and strategy affect how incumbents manage disruptive innovations. The firm provides a particularly compelling example in that, despite early investments and recognition of the disruptiveness of digital imaging<sup>1</sup>, the firm encountered problems in the transition to the new technology.

Since this paper focuses on incumbent strategy and the implementation challenges that confront decision-makers, high-level managers who played a substantial role in forming the strategy were interviewed. This information was supplemented with secondary data obtained from other publicly available, firm specific research. Relying on a single case study obviously constrains the generalisability of the findings in this paper. Therefore, this paper does not attempt to provide ambitious answers to how incumbents can manage disruptive innovations. Rather, it explores whether incumbent size and strategy matter or not for managing disruptive innovations.

This paper draws upon earlier proposed entrant-incumbent models (e.g. Christensen, 1997; Christensen and Rosenbloom, 1994; Henderson and Clark, 1990;

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<sup>1</sup>Digital imaging is the capture, manipulation, storage, transmission, and output of an image using digital technology. Digital imaging is competence destroying for analogue photography firms in that it requires the mastery of new scientific domains such as semiconductors/electronics as well as the development of different distribution channels and new customer relationships (Rosenbloom, 1997).

Tushman and Anderson, 1986) in order to explore how and why some incumbents win disruptive battles. Since these theories have some limitations in explaining incumbent success stories, the findings in this case study can illustrate some of the shortcomings of previous literature. In particular, it points out that the frequently used classification of firms as either entrants or incumbents is too broad and in the latter needs to be further nuanced in order to allow for more precise managerial implications.

The remainder of this paper is organised as follows. The next section reviews literature on discontinuous innovation and entrant-incumbent dynamics. The subsequent section contains a description of the methods used in this paper. Then the case study is presented in order to illustrate how a particular incumbent firm encountered severe problems, but eventually survived the disruption. The final section contains an analysis of the case study and a discussion about its theoretical and managerial implications.

## **2. RECEIVED THEORY**

It is well documented today that many established firms find it hard to adapt to changes in the technologies they employ. Frequently, incumbent firms do not manage the shift to the new technology, they lose market shares and the successful firms are found among the new entrants (see e.g. Olleros, 1986; Tushman and Anderson, 1986; Christensen and Rosenbloom, 1994; Utterback, 1994; Christensen and Bower, 1996). Christensen (1997) explains this by making a distinction between sustaining and disrupting technologies. Sustaining technologies have in common that they improve the performance of established products along the dimensions that mainstream customers value. Disruptive technologies on the other hand, initially underperform along these dimensions. Typically, it is simpler and cheaper than the sustaining technology. As the performance of the disruptive innovation increases it begins to attract customers from the sustaining technology and over time, it destroys the market for the sustaining technologies. Through his studies of the disk drive industry, Christensen showed that incumbents usually win sustaining battles whereas entrants succeed in disruptive battles.

Focusing on slightly different aspects of new technologies, several authors (Henderson and Clark, 1990; Christensen and Rosenbloom, 1994) argue that a firm's resources evolve around a particular technology and that they therefore encounter problems in the transition to a new technology which requires different routines. Thus, a firm's capabilities in one technological paradigm may present a barrier to success in a new technology. Leonard-Barton (1992) provides a similar argument, suggesting that a firm's core capabilities may in fact act as core rigidities that inhibit the transition from one technology to another. One reason for this is that capabilities are associated with certain values, which are difficult to change. Prahalad and Bettis (1986) argue that as managers work together they tend to develop a common set of beliefs, a 'dominant logic' based upon their history. In line with this, Adams, Day and Dougherty (1998) use the term inertia when they describe how people within an organization tend to proceed as they always have.

Christensen (1997) draws upon resource dependence theory (Pfeffer and Salancik, 1978) when he argues that incumbent firms are "held captive" by their most important customers and therefore resources are not allocated to initiatives that are initially small and less profitable. Christensen refers to this pattern as the innovator's dilemma, arguing that disruptive innovations present a particular challenge for incumbents since they require managerial skills that are different from the ones needed to succeed in sustaining battles. Besides analysing the causes of incumbents' problems

to deal with disruptive technologies, Christensen also derives a number of managerial solutions. He argues that managers in incumbent firms basically have three options, they can *change the processes and values of the current organization, create an independent organization, or acquire a different organization.*

Firms that seek to *change the current organization* in order to adapt to the disruptive innovation have a weak track record (Christensen, 1997). The main reasons for this are related to the resource dependence that the innovator's dilemma originates from.

An *independent organization* can be regarded as a structure in which an organization develops new resources that are different and separate from the rest of the firm. It has objectives that are largely independent from and outside the current operations of the firm. As the new technology evolves within the organization, the needed processes and values are also developed (Macher and Richman, 2004). This is one of Christensen's most influential recommendations for managing disruptive innovations. Nevertheless, this recommendation has been questioned by Cohan (2000) who studied two successful incumbents who did not pursue this strategy.

When firms are not able to develop disruptive innovations, they can adapt by *acquiring* companies that possess the resources that are needed for developing the new technology. By doing so, the competencies needed for developing disruptive innovations can be incorporated into the organization rather than developed. In order to successfully manage disruptive technologies through acquisitions, Christensen and Raynor (2003) state that the incumbent should look for resources rather than processes and values since these are more likely to vaporise when being incorporated into the incumbent firm. Resources, on the other hand can be integrated as a way of leveraging the parent firm's existing capabilities.

Though the problems and solutions described above are well elaborated, they suffer from some drawbacks mainly due to a lack of clarity in the terminology used. The term incumbent may be too general to provide an understanding of how disruptive innovations can be managed. In the discourse regarding disruptive innovation, incumbents are treated as one population vis-à-vis entrants, rather than as many populations with different resources, market positions and strategies. If the explanation to why incumbents lose disruptive battles can indeed be found in resource dependence theory, the connections to different stakeholders should arguably vary between incumbents of different sizes and with different strategies. This implies that there could also be a substantial amount of heterogeneity among the solutions to the innovator's dilemma. When a distinction between different incumbents in terms of resources and strategy is not made, the understanding of disruptive innovations may be hampered. Consequently, the managerial solutions to disruptive innovation can potentially be improved further by addressing the heterogeneity of incumbents. Consequently, this calls for a more nuanced view of incumbents, their resources and strategies.

Furthermore, Christensen and Raynor (2003) underline that disruption is a process and not a discrete event, and that it thus may take a long time for new technologies to influence, and eventually disrupt an industry. Given that disruption is a process, it should strike at different points for different firms depending on the segment in which they are operating. For example, for an incumbent with a high-end segment strategy it should take much longer time before it is hit by the disruption compared to an incumbent operating in low-end segments.

According to Danneels (2004) future research should investigate under what circumstances a spin-off is the best way to develop a disruptive technology. Moreover, Danneels (2004) proposes that future research in particular should investigate alternative routes for incumbents to access disruptive technologies, looking into the possibilities for using alliances, acquisitions, and internal development more in detail. This paper addresses these issues by exploring how an incumbent's size and strategy affected its managerial response to disruptive innovation.

### **3. METHODS USED**

The case study examined below illustrates how Hasselblad failed to develop new capabilities on its own and then succeeded by acquiring them instead. This firm was not chosen at random. Rather, it was targeted since it has enjoyed a long-standing leadership through innovation. Moreover, it does not possess the characteristics of most incumbents that are studied in the field of disruptive innovation. The firm is operating in the high-end segment of the camera market, targeting professional photographers with a high demand on performance. Being present in a relatively small segment implies that the firm does not have the same sizeable revenues as many other incumbents. By studying how a firm with these properties responded to and managed the disruptive threat, conclusions regarding differences between how incumbents manage the innovator's dilemma can be drawn. An additional reason for studying Hasselblad is that interviews with current and former high-level managers of the company were feasible.

Since this paper focuses on corporate strategy and the implementation challenges that confront managers, only high-level managers who played a substantial role in forming the strategy were interviewed. This information was supplemented with a large amount of secondary data obtained from other publicly available, firm specific research.

The research method employed here resembles the one employed by Macher and Richman (2004). All field research interviews began with general open-ended questions, asking managers how their organisation had coped with the challenges posed by the disruptive technology. The generalisations that form the description of this case emerged after similarities in the answers had been received.

### **4. CASE DESCRIPTION**

Hasselblad has for decades been one of the leading camera manufacturers and has sometimes been referred to as the "Rolls Royce" of the camera industry. The company received global recognition in 1962 when it was used on a journey to space. After that, Hasselblad started to collaborate with NASA and in 1969 the first photos of Neil Armstrong on the moon were taken with a Hasselblad camera. During the following decades, a series of high-performing cameras for professional photographers were developed. This case study will focus on the time period 1980 to 2005, which is the era when Hasselblad's analogue cameras were disrupted by digital imaging.

In 1981, the camera industry was shaken when Sony introduced the first digital camera, Sony Mavica. Many of the large Japanese manufacturers feared that their mechanical cameras would eventually be substituted by digital cameras. In 1984, many of them had developed their own models similar to the Mavica. The CEO of Hasselblad at that time, Jerry Öster, recalls how the firm gathered information about digital technology in order to understand the threat. He concluded that the Mavica technology had so many weaknesses and limitations that it would not lead to a commercial success.

The R&D manager of Hasselblad at that time, Lennart Stålfors reached the same conclusion. However, Öster still noted that “*even though I did not believe in the Mavica concept, I was convinced that the photo chemical film would in the future be subject to serious competition from digital photography and would eventually be substituted by this technology*”.

However, Öster thought that Hasselblad was too small to make the investments in R&D required in order to overcome the weaknesses of the new technology. Rather, he argued that Hasselblad should gather knowledge about electronic imaging and thus follow the development in the area in order to be able to develop digital cameras later. Hasselblad sought to do this by developing digital products that were complementary to the cameras they sold. One such example is the telephoto sender Digiscan, a digital scanner that enabled faster printing of photos. The product was launched prior to the 1984 Olympics in Los Angeles and was an immediate success. Its superior performance allowed photographers to send photos at a higher speed and with a better quality. Digiscan was further developed and two years later, the telephoto sender was mass-produced under the name Dixel 2000. The end-users of the product were the photographers who also used the Hasselblad cameras.

By creating an independent organization, Öster thought that this technology could be successfully launched. Hence, in 1985 the subsidiary Hasselblad Electronic Imaging was created and the production of Dixel 2000 was moved into this company. This subsidiary also developed software and technology for digital storage of photos. The subsidiary expanded rapidly and reached break-even in three years. During the time 1989-91 it was actually the most profitable subsidiary of Hasselblad. The CEO of the subsidiary, Lennart Stålfors, argued in 1987 that digital imaging in the long run would take market shares from the chemical photo technology.

Much of the commercial success of Hasselblad Electronic Imaging had been thanks to the Dixel 2000 telephoto transmitter. But in 1992, Nikon launched a Direct Telephoto Scanner that outperformed Hasselblad’s Dixel 2000 and revolutionized the industry. Since the market for these products was small, sales of the Dixel 2000 decreased rapidly.

At this time, Hasselblad was bought by Incentive, a Swedish investment company. Incentive was committed to digital technology and was willing to invest extensively in it. They recruited a new CEO, Staffan Junel, who had a background in electrical engineering and believed in the potential of digital imaging. Thus, in 1993, the company started the development of a digital camera. The former CEO of Hasselblad Electronic Imaging, Lennart Stålfors, became in charge of this development project that was brought into the mother company. Senior management thought that the subsidiary should produce digital applications, while camera development belonged in the mother company where development of mechanical cameras also took place.

Though digital and mechanical photography had separate budgets, these projects were to some extent competing with each other. One member of the product board recalls that “*we had one budget in the product board and money had to go to either the digital camera system or the mechanical camera system*”.

When the development of a digital camera had started, it soon became apparent that this technology had some properties that made it fundamentally different from an analogue camera. By that time, it was not possible to take photos of moving objects with digital technology. Moreover, the photo quality was lower than with an analogue Hasselblad camera. Along other performance dimensions, digital photography had

many attributes that made it more attractive. Photos could be replicated, manipulated and sent at a much lower cost and much more conveniently than with analogue imaging. Thus, the business utility of digital technology was in fact very large, yet different from what Hasselblad was used to offer its customers.

With these properties in mind, Lennart Stålfors thought that the best thing to do was to develop a camera for studio photography. This customer segment would hopefully be willing to trade off some photo quality for the opportunity to take many photos, make copies and sending the photos in an easier way. The produced volume would not be large and the camera would be very expensive. Stålfors then intended to improve the technology incrementally while lowering the price at the same time. He therefore also made sure that the camera was modular in its structure so that each component could be taken out and modified.

The development of the digital camera took place both in-house and in various collaborations. One of the largest projects was undertaken together with Philips. Among other things, this resulted in a sensor for digital cameras. *“Many large companies were willing to cooperate with us despite the fact that we are so small. Our strong brand helped us a lot”*, Lennart Stålfors recalls.

In 1996, Hasselblad was sold to the Swiss Union Bank. The bank declared a short-term scope of ownership and was more sceptical to digital technology than the previous owner had been. The CEO Staffan Junel disagreed with the new strategy and left the company.

The same year, a working digital camera prototype had been developed and was presented to the board. The board was skeptical: *“it was huge and did not look like a camera at all”*, one member of the board recalls. Moreover, since the camera was made for studio photographers it was standing on a tripod, something a Hasselblad camera had never done before. Hasselblad had always been a hand-held camera and therefore, the prototype did not come across as being a real Hasselblad. Moreover, the camera was connected to a computer, which was also something completely new. One member of the digital development division notes that *“for those who understood the niche for the new camera and its advantages it was obvious that the camera had a large potential. But the board related it to the analogue cameras and therefore dismissed it as not being good enough.”* Overall, Hasselblad by that time had too little contact with their end customers. *“Hasselblad’s offer ended when the photo was taken, we were not good at producing services or applications that would increase our revenues”* another member of the digital development division says. Since many of the advantages brought about by the digital technology were outside this narrow business definition it became even more difficult to convince management to continue with it.

There were additional reasons for the board to be critical towards the digital technology. Some meant that the digital technology’s lower performance would damage the brand of Hasselblad. Others thought that it was impossible to compete with the large camera manufacturers. Stefan Arvidsson, member of the board, says: *“In the long run we would not have been able to keep up with the others. Compare us to what the huge Japanese companies spend on development. I still think stopping the project was the right thing to do.”*

Others, especially those who had been working with digital technology, thought that the decision was a disaster. Bengt Ahlgren, who was a member of the board at that time, says that the company was well capitalized and that there was in fact enough money to pursue both projects: *“During the 1980’s a large amount of capital was*

*accumulated in the company in order to be able to conduct this kind of projects. But the new owner handed out this money to the shareholders and downsized the digital development because it did not generate profits in the short term.”*

Moreover, Ahlgren argues that Hasselblad could in fact have competed with the larger camera manufacturers: *“We once asked Canon why they don’t move into our segment. They answered that they had the resources to do so, but that this niche was so small that the investments associated with entering it would not be profitable. Moreover, they said that Hasselblad’s brand made it difficult to compete in this small niche of the camera market. Hasselblad did not have to develop everything on its own. Throughout the years our reputation had made us an attractive partner for collaborations.”*

Shortly after the digital prototype had been turned down, the new CEO announced that Hasselblad should lay off all its resources in digital technology and instead focus on the conventional technology. The new strategy was to pursue some collaborations and thereby follow the digital development, while focusing Hasselblad’s own resources on analogue technology. After this there was virtually no digital competence left within Hasselblad, and there was a large desire within the company to develop a new analogue camera. In secrecy, a few persons were still working with digital technology. But the main purpose with this was rather to remain updated within the area so that the transition to digital technology would be facilitated when that time would come. Thus, most of this work took place in the form of collaborations. One person who was working with this said that *“we had to collaborate and buy technology from others since our resources were now allocated to the development of an analogue system.”* In 2000, Hasselblad initiated a collaboration with the American firm Foveon. But too little resources were allocated to the project and in the end Foveon’s technology was developing at a much higher pace.

In the meantime, the development of Hasselblad’s new camera system, the H1, proceeded. However, this project was heavily delayed and the product was not launched until 2002, instead of 1998 as originally planned. Thus, it was four years too late, had cost 150 MSEK too much and did not have all the features that originally was intended. This delay turned out to be critical. One member of the development team notes that: *“if the H1 would have been launched in 1998, we would have had four good years of revenue from it. When the H1 was finally launched it was a fantastic product, but that did not matter since most cameras were completely digital then.”*

The H1 system was a hybrid, which could use both digital and analogue backs. The digital backs were initially delivered by Kodak and PhaseOne. Since Hasselblad did not manufacture their own digital backs this meant that they could not deliver a complete digital camera themselves. At the same time, the performance of digital cameras had increased to the extent that Hasselblad’s position was threatened by actors that had not even been their competitors before. One of Hasselblad’s most profitable segments, wedding photos, had for decades been a market that was protected from competition. But within a few years, Hasselblad lost this market to Canon due to the shift from analogue to digital technology. The firm now experienced a severe drop in revenues. As the market for digital cameras expanded rapidly, Hasselblad encountered further problems being caught with a technology that was essentially analogue.

At the end of 2002, the company was bought by the Shriro Group, a Chinese firm which had been the distributor for Hasselblad for more than 40 years. The new owner sold off all subsidiaries of Hasselblad and downsized the firm. Hasselblad now had to develop a complete digital camera system, which included digital backs. Imacon,

a Danish firm which was leading in digital camera technology was acquired. Imacon and Hasselblad were merged together and Hasselblad could now develop a complete digital camera system. After having been close to bankruptcy in 2004, the company recovered financially and is now successfully manufacturing digital cameras for professional photographers. A long and dramatic journey for Hasselblad had been made, or as the CEO Lars Papilla expressed it in May 2004 - *“the shift to digital technology was much more dramatic than we had expected.”*

## **5. ANALYSIS AND DISCUSSION**

The case study of Hasselblad can indeed be regarded as an illustrative example of the innovator's dilemma. The case study clearly illustrates that the digital cameras were in fact disruptive. While having a lower performance along traditional measures such as photo quality it had other attributes such as the possibility to store, replicate, send and manipulate photos more easily and at a lower cost.

The subtitle to Christensen's book was *‘why great companies fail’* (Christensen, 1997). Given that the first images of man on the moon were taken with Hasselblad cameras, the company can indeed be regarded as ‘great’ and innovative. By providing superior technology, the Hasselblad name became associated with quality and great performance. Albeit the firm eventually managed the transition to digital technology, it encountered significant problems when facing disruptive innovation and was very close to bankruptcy.

Turning to the specific focus of size and strategy of incumbent firms, it can be seen from the case study that these factors clearly seemed to influence the way Hasselblad responded to the disruptive digital technology.

### **5.1 FOCUS ON THE HIGH-END SEGMENT – AN OBSTACLE FOR EXPERIMENTATION?**

Interestingly, Hasselblad recognized both the future importance of digital technology and that it needed to manage this technology in a way that was different from its handling of sustaining technologies. This is illustrated by how the CEO Jerry Öster decided to create the independent subsidiary Hasselblad Electronic Imaging in 1985. Both Öster and the manager of Hasselblad Electronic Imaging Lennart Stålfors thought that there was more future potential in the subsidiary than in the parent organization. Öster realized that the disruptive technology would initially satisfy other needs than those demanded by the current technology, and the successful launch of the telephoto sender could be regarded as one example of this.

Hasselblad had been highly successful in the sustaining, mechanical technology, but despite recognizing the digital technology at an early stage, the firm ran into difficulties. It seems as though resource dependence theory provides a valid explanation for why this happened, as suggested by Christensen (1997). The continuous demand from investors to focus on profitability and therefore downsizing disruptive initiatives could be regarded as one example of this. Furthermore, digital cameras could not initially provide the superior performance that was demanded in the high-end segment where Hasselblad had established a unique position. While the development of complementary products in the field of digital imaging was allowed, and this field actually performed very well until the competition from far larger competitors turned out to be too difficult, top management appears to have been much more reluctant to trying out the digital technology in the core business of cameras. A reasonable explanation for this, apart from the displayed inertia in terms of values and resources, is

that the low performance of digital cameras at the time would have constituted a risk for the valuable brand reputation of Hasselblad.

Hasselblad's customers associated the brand with quality and superior performance and this image could have been damaged when moving into an inferior technology. In its niche, Hasselblad had 40 percent of the market share and moving away from such a segment would be very risky. Launching a digital camera with a performance level significantly below the one of the existing Hasselblad products had most probably not been seen positively by Hasselblad's demanding customers. In this respect, other camera manufacturers selling also to amateurs with lower demands had better possibilities for early experimentation and learning. The values associated with the Hasselblad brand implied that a transition to a lower performing technology was not desired. Based upon a history of landmark events such as the photos taken on the moon, a dominant logic (Prahalad and Bettis, 1986) emphasising extreme performance had emerged within the firm and this further implied that moving into digital technology was difficult. Clearly, the firm's core capabilities in the mechanical technology in this sense turned into core rigidities when facing the disruptive technology (Leonard-Barton, 1992).

## **5.2 FIRM SIZE LIMITING THE POSSIBILITIES TO KEEP OPTIONS OPEN**

During the mid 1990's the firm continuously moved away from the disruptive technology and instead embraced the sustaining technology that had proven to be successful for so many decades. When a prototype digital camera was finished, the new owners in 1996 argued that the firm could not develop a digital camera system and at the same time continue with conventional cameras. When the new CEO in 1997 decided to focus solely upon conventional camera technology and pursue only collaborations in the digital technology area, another step in this direction was taken. It appears as this decision was also affected by the firm's size and its available resources. Given the new owner's short term scope, there was no room for developing digital capabilities within the firm and consequently they had to be laid off.

The decision to focus on the established technology and develop digital applications further is clearly an example of how innovative firms are "held captive" by their most important customers. In line with Danneels (2002), Hasselblad did not have a "marketing competence", i.e. the firm could not leave its high-end segment in order to find new customers where the disruptive technology could be made profitable. It can be argued that the limited size of Hasselblad accentuated the difficulties involved in meeting the disruptive innovation as the company ended up in an either-or situation, due to its financial constraints. It would have been very difficult for the company to pursue development in both the new and the established technology fields simultaneously, especially as the owner at that time had limited interest in long-term investments. Hasselblad tried to keep the option of developing a digital camera open through collaborations and the focus on a hybrid camera, but also lost valuable time in doing so.

It also appears as particularly difficult to manage businesses with different logics within the same firm. The Hasselblad case illustrates how digital complementary assets such as storage systems could be developed while producing analogue cameras. But to use the digital technology in the core business of cameras required a different strategy since it was not consistent with Hasselblad's choice of being only in the high-end camera segment. In such a situation the importance of having 'deframing skills' (Dunbar, Garud and Raghuram, 1996) increases a lot. This argument suggests that the strategic beliefs among top managers need to be changed in order to manage disruptive

changes. Even though Hasselblad initially recognized the disruptiveness of digital technology, the key strategic decisions taken during the 1990's reveal an inability to unlearn. In a small company which has had a very clear and consistent business strategy for several decades, it is probably more difficult to challenge the existing way of doing things than in a larger firm where different strategies are used for different businesses and also change over time.

Summarising the above, it is seen that an incumbent's size and strategy most likely affect its response to a disruptive technology. For a firm like Hasselblad, the relative cost of pursuing digital technology is much higher than for a larger incumbent, and hence, the forces of resource dependence are even stronger. Moreover, digital cameras could initially not satisfy the demands that Hasselblad's high-end segment required. In contrast to this, larger camera manufacturers like Canon and Nikon could develop capabilities in digital photography while they were producing conventional cameras. These firms had the sizeable resources that were needed in order to undertake this kind of ventures. Furthermore, they were operating in the amateur segment for cameras, which could tolerate the lower performance that the disruptive technology initially provided.

Eventually, acquiring the capabilities needed turned out to be the most successful strategy. By doing so, Hasselblad could obtain the resources that they had struggled to develop themselves, first through an independent organization and thereafter through collaborations. This acquisition was not made in order to obtain values or processes, but rather it took place since Hasselblad needed the digital capabilities of Imacon. This is probably one reason why this acquisition turned out to be successful (Christensen and Raynor, 2003).

### **5.3 CONCLUDING REMARKS**

It can be seen in this case study that Hasselblad's limited size and its niche strategy made the firm highly vulnerable to the innovator's dilemma despite the fact that the disruptive effects of digital imaging were recognized and dealt with very early. For a small incumbent like Hasselblad, the relative cost of developing the disruptive digital technology was much higher than for larger incumbents like Nikon or Canon. Hence, Hasselblad had to choose between digital and conventional technology and due to the forces of resource dependence the firm focused on the sustaining technology instead of the disruptive one.

However, it should be underlined here that there are several examples of large incumbents in the low-end segment of the camera industry that encountered problems despite its sizeable revenues and its low-end strategy. One such example is Polaroid (Rosenbloom, 1997; Tripsas and Gavetti, 2000) which initially sought to develop digital cameras and complementary assets but failed and after that focused on conventional cameras. Since this pattern is strikingly similar to what happened to Hasselblad, incumbent size and strategy can clearly not be the only factors explaining how firms respond to disruptive innovations. This paper does not argue that these are the only, nor the most important determinants, rather, it argues that size and strategy influence the response of an incumbent and that they should be taken into consideration when looking for managerial solutions to the innovator's dilemma. For instance, when Bengt Ahlgren argued that Hasselblad in fact could compete with Canon and Nikon in the long run, he referred to collaborations and other strategies that were clearly a consequence of the firm's size. He moreover argued that Hasselblad had an extremely strong position in its

niche which kept it from being outperformed by larger actors, something that of course is not the case for all smaller companies.

The case investigated in this paper illustrates that the incumbent's size and its strategy matters for understanding how disruptive innovations affect firms and consequently how they can be managed. These findings suggest that the heterogeneity of incumbents has been downplayed by previous literature and it calls for further investigations to allow for the development of a more nuanced view of established firms' possible ways of responding to disruptive innovations.

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