

Digital Equipment's Rise and Fall, Could it Have Been Avoided?

1 Dissertation proposal

1.1 Motivation

It is appropriate that I started this PhD thesis exactly fifty years after the founding of DEC. DEC itself was founded in 1957 by Kenneth Olsen and Harlan Anderson after they left MIT where they had worked on the Whirlwind project, primarily on the TX series of test computers. They also employed Stan Olsen, Ken's brother as employee number three. Harlan Anderson left in 1966 after an ongoing disagreement with Olsen. DEC grew to a multi billion dollar company, second only to IBM in the late 1980's. From this peak it went into rapid decline, searching for a strategy and finally selling out to Compaq in 1998. The cause of the decline is not straightforward, there were many management errors including the choice of technology, direction, proprietary design and organisation. The book "DEC is Dead, Long Live DEC" written by Edgar Schein [1] goes some way to explaining the decline but focuses primarily on the management and is heavily biased towards the years that Ken Olsen was in charge. Peter DeLisi commented¹ that he had collaborated in the book but that near the end Schein finished it alone and he was not in total agreement with some of the conclusions, feeling they were biased towards the area that Schein knew rather than covering all the areas they had investigated. This thesis looks at the history of the company, identifies important points in its history that influenced its eventual downfall and offers conclusions about what went wrong and what could have been had the merger with Compaq not taken place. It looks at what caused the downfall in terms of management and technology and then goes on to identify the potential management and technical errors that led to a failure to turn the company around. The views of many DEC alumni were sought and they bring in many theories from 'it was doomed to failure in 1980' to 'there was no way it should have been sold'. Many blame Ken Olsen, many others blame Robert Palmer others blame the senior management and others the technical development people. All of these theories go some way to explain the downfall but none give the complete picture and none theorise on what could have been. This thesis looks at all of the theories, analyses them to try to give a complete picture of why the company went into decline but more importantly looks at what might have been, albeit given the benefit of hindsight. It does not condemn the management as they did not have the benefit of hindsight that we now have and worked to the best of their ability at the time. In order to achieve this goal it was necessary to look into the finances of the company to determine the viability of continuing rather than selling out to Compaq as well as the technology that was available to exploit and the financial performance of the products sold off. As will be shown, the finances at DEC were still in good condition even after a number of years of losses and cutbacks. The main issue was the cost of sales which will be investigated later, but the company still had over \$2 billion in the bank, only around \$1 billion long term debt and \$10 billion of

¹ Interview in Mountain View 2008

assets in 1998. Annual sales were still running at around \$14 billion but they had lost market confidence by their perceived lack of focus and product direction.

A number of things contributed to the decline of Digital Equipment, in the 1980's General Doriot became ill and eventually died. This was a great loss to Ken Olsen as Doriot had been his mentor and shield from the board. He advised Ken on many things and was very influential in many of Ken's decisions. After his death, Ken was influenced by Harvard Business School and put a business school graduate in Doriot's place². Ken's relationship with the board deteriorated even though he had increased its numbers and eventually he was replaced. Also in the early 1980's Gordon Bell had a heart attack, attributed to the stress of work in charge of engineering at Digital. He had a strained relationship with Ken Olsen as portrayed in [1] and after his heart attack he left to return to academia. This was a blow to Digital as their chief technologist and directional guru had left and there was a vacuum in their ranks, although he stayed in contact with Ken Olsen and offered advice on technology.

There have been a number of papers, articles and books written about the downfall of Digital Equipment Corporation (DEC) in particular, as mentioned earlier, Edgar Schein's book [1] which analyses the company's failure and concludes that it was the lack of the "money gene" in DEC management that caused the failure. Schein proposed that the management was the root cause of the company being in trouble by 1990 but it covers little of the final years of the company and the causes of its final failure. It is suggested by the author, that the failure was far more complex than Schein suggests. For example Schein's book gives minimal consideration to the downsizing processes that were implemented during the 1990's, the impact that they had on the company, the personnel involved and their part in the company's eventual downfall. It tends to focus on the management meetings, the conflicts at those meetings and the lack of focus on money by the management. Many of the ex-DEC employees have been very critical of Schein's writing, feeling it was biased towards management and ignored the technical aspects thus not portraying the complete story. Schein's views led Gordon Bell to write an appendix to the book, which can be found on his website³, offering his view on what went wrong. Again Bell however glosses over the downsizing process and its impact on the company's future. The other authoritative book on DEC is "The Ultimate Entrepreneur" [2] which tells the story of Olsen and DEC including the problems the company had in the last years of Olsen's tenure as president. This book does not mention staff reductions at all, being written just before the main downsizing began, nor does it look at the potential for the technology that DEC missed. In December 2009 Harlan Anderson [3] published his memoirs in which he covered his

² Interview with Debra Amidon

³ Gordon Bells appendix to Schein's book

http://research.microsoft.com/~gbell/CGB%20Files/DEC_Is_Dead_Bell_Appendix_Schein_Book.pdf accessed 2008

turbulent relationship with Olsen and also offered some thoughts as to what went wrong at DEC. He looks at Olsen's relationship with the engineers, who were the power behind some of DEC's early computers, and how that impacted the company. His comments are mainly on his early years at DEC and the views on the company downfall appear to be mainly relaying the views that appeared in the press at the time. He doesn't offer any new commentary on why the company failed nor what could have been done to save it.

1.2 Thesis structure

This thesis is divided into 8 chapters.

Chapter 1 is the introduction and sets the scene to the rest of the thesis.

Chapter 2 covers the methodologies used in the research of the topic. As this is a case study there is not a single methodology employed and this chapter describes the major aspects of study that were employed to analyse the company financially, morally and its products.

Chapter 3 investigates the relevant literature that covers the wide variety of areas that were instrumental in the downfall of DEC. It is split into focus areas to keep the flow of data in a format that can be followed by topic rather than chronologically.

Chapter 4 covers a brief history of DEC products and some of the people involved in the success of the company over the years. This chapter is split into decades and flows chronologically to bring out the development of the company and its products. It covers the major hardware from the beginning and then brings in the software and applications as DEC moves from a hardware vendor to a systems vendor.

Chapter 5 is an analysis of the financial aspects of the company which, even though it posted a number of negative annual statements it still had a healthy balance when it merged with Compaq. Much of the later financial data is complicated by wholesale sell offs and plant closures which make analysis difficult.

Chapter 6 is the main part of the thesis where the reasons for the failure are examined and the state of the company at the end is established together with an analysis of what happened to the technology after the merger. It looks at the products that helped to keep the company going, those that cost the company both financially and in terms of reputation and personnel. It also considers some of the products that DEC did not promote and those that it did not see as important but which in hindsight were major differentiators.

Finally chapter 7 looks at comparable companies who went through the same issues at the time and investigates how they managed to survive when DEC didn't. During the 1990's four companies dominated the computer marketplace. IBM, HP, SUN and DEC and all four went through issues involving the change in the marketplace, reinventing themselves and defining a new strategy for growth. Of these only DEC failed but SUN followed some ten years later. Other companies such as Data General went the same way as DEC although not reaching the same heights.

Chapter 8 is the concluding chapter and summarises the findings of the research, suggesting some lessons that could be learned by any company that finds itself in DEC's position.

Included in the Appendices are the timeline put together to analyse the important events that occurred in the company history and the people that were influential in its growth and decline as well as a short biography of the key people identified. Also included are the papers that were authored and were delivered at the Association of Business Historians conference in Birmingham in 2008, the Society for the History of Technology conference in Pittsburgh in 2009 and the World Computer Congress in Brisbane 2010 together with an amended version of the ABH paper which was published in the journal of business history "Zeitschrift für Unternehmensgeschichte" in 2010 [4].

1.3 Methodologies Used

The chapter on methodologies outlines the various methodologies used in the preparation of this thesis with background information on why the particular methodology was used and why it was deemed important. It covers an extremely complex subject and so it was necessary to employ a number of research methodologies to cover the rise and fall of the company and the state of its technologies at the end. This thesis considers Digital Equipment Corporation as a case study, applying both qualitative and quantitative methodologies in its analysis. As it is a number of years since the company was sold, it was essential that some investigatory work, primarily interviews, was performed earlier than normal. This was essential due to the fact that many of the personnel involved were ageing, mostly 65 upwards, and memories, if not completely failed, were potentially fading in many of those that it was important to interview. A company timeline was constructed in the early stages of the study to align the products and people to determine what and who influenced the company's development. This is depicted in Appendix A.

1.3.1 Quantitative analysis

As mentioned above both quantitative and qualitative methodologies were used to gather and analyse data for this thesis, however the majority of the data related to qualitative methods and as such the quantitative analysis was mostly performed on the financial and employee population data. In order to see what the state of the company was over the years an investigation was made on the figures reported to the Securities and Exchange Commission (SEC filings) in the United States and analysis of the company's annual reports from 1967 to 1996. The data was amalgamated into one spreadsheet from which a number of graphs and other observations were able to be made as well as some interpreted facts. These allowed analysis of the profit and loss, number of employees, assets and income for product and service. This was a quantitative analysis of a large amount of financial data from a number of years and provided an interesting view of the company performance over the years.

Cost of product development and personnel was also made a candidate for analysis and this too added to the understanding of the issues that were to hit the company in the 1980's. Later, comparisons were made with similar competing companies who survived the period and grew and an analysis of their financial and personnel data was also performed although not as detailed as in the case of DEC. In terms of downsizing, number of employees, cost of staff reductions and facility reductions were analysed along with comparative figures from competitors at the time. Again the figures were obtained from SEC filings.

1.3.2 Qualitative analysis

Professor Robert Brewer [5] covers the classifications of qualitative research under the headings of phenomenology, hermeneutics and ethnography. Part of this thesis looked at the subject from a phenomenological aspect in the terms of individual experience gathered from interviews. The rest of

the thesis considers the subject from an ethnographic aspect from the results of survey and emails. Data collection for qualitative analysis consisted of subjective methods such as surveys, interviews, email contact, analysis of notes file entries, archive material and various reports and memos that were sent during the research. This allowed a substantive analysis of the company during the period in question. A broad range of data was collected which needed to be classified and sorted into what was relevant to the thesis topic and what was not.

1.3.3 Personal contact

Digital Equipment Corporation was a company with a culture that lasted well beyond the life of the company. When the downsizing started a number of Alumni associations sprang up that spanned the world. These associations are still alive over ten years after the company's demise and still as strong as ever, many are still growing. The Alumni associations were used in the data gathering process of this thesis, not only to locate any data that was available but also to make personal contact with many of the ex-employees to gather their comments and feelings. Initial contact with the alumni associations gave access to over 2000 people across the world which enabled an excellent view on certain actions of the company and also information on product development, strategy and management. In the later part of the data gathering, use was made of the 'linkedin' network as DEC alumni people had just started a group on the web site and this gave access to over 10,000 ex-DEC employees. Alongside the contact from the Alumni associations, personal introductions and web access enabled telephone conversations with many high level managers and engineers involved with the company throughout its life. A network of high level people was able to be constructed and other contacts subsequently made. Obviously personal statements are always tinged with bias depending on where, when and what the particular people were involved with. Many of the people were happy to talk but a significant number did not want their comments attributed directly to them, others asking for veto rights on reporting of comments. A number of senior managers were contacted for their views and recollections of what happened during the period in question. The results of this contact was mixed, some were happy to contribute, others did not respond, others said they would like to help but didn't actually reply when questions were asked and finally there were others whose memories had failed and were understandably unable to contribute. Among these were Ken Olsen, Stan Olsen and Pier Carlo Fallotti.

Attempts were made to interview board members from the time, all of whom were still alive, many in their eighties. A large proportion of the board were reluctant to answer any questions about the period but a few did give some detail. Even though all of the board members were alive at the time and contact was made with all of them in one way or another, only two were willing to talk directly about their time as board members, most saying they were unwilling to discuss such inquisitive things.

During the investigation of DEC workstation engineering, contact was made with the vice president at the time of the MIPS episode. This proved to be an extremely fortunate contact as Don Gaubatz not only had archival material which he made available but also had many senior contacts. Don provided introductions to many people, enabling a much deeper analysis of what happened and also provided comments, documents and recollections from a much broader audience than anticipated at the start.

1.3.4 Interviews and Survey

Use was made of the contacts to conduct interviews to gain as much knowledge of the company's performance as possible whilst memories were relatively fresh. Use was also made of interviews undertaken by Ben Strout who had spoken to a number of senior individuals connected to the company in his research for a documentary about Ken Olsen⁴. Ben suffered a major heart attack during the filming of his documentary which was subsequently taken up by Donald Boggs who provided the transcripts from the interviews along with permission from Ben's widow for their use. A guided open approach was taken to many of the interviews in order to allow the participant as much freedom to talk about all aspects of the company, giving an insight into many different areas without prompting. Most of the telephone interviews lasted for around an hour with only a few lasting less than half an hour. The majority of the interviews were with US or European based contacts with face to face preferred for UK based contacts. It was possible to do face to face with a number of US based contacts when visiting the archives or speaking at a conference which proved to be easier to keep on track. A number of individuals interviewed requested anonymity for some comments and others declined to answer some questions due to the sensitive nature of the subject. A total of twenty-one face to face or telephone interviews were conducted with another forty-nine transcripts from Ben's documentary. These, as well as a number of e-mail conversations gave a good picture of the company during the latter part of the century. On the whole the interviews were conducted in an informal manner resulting in some candid comments that might not have transpired had the interviews been held in offices. This unstructured approach was taken during one to one interviews by telephone or face to face. A more structured approach was adopted when it came to conducting a survey. A survey was conducted of the DEC Alumni to understand the impact of the rightsizing that went on in the 1990's and this is analysed in chapter 6. The web based survey was carried out to understand the implications of the downsizing efforts at DEC during the 1990's. There were almost 1000 completed surveys giving a precision of 3.5%.

1.3.5 Ethics

Ethical standards were adhered to during the research. The survey was anonymous unless the respondent wished to give their name or email address for further comment. When face to face

⁴ Ben Strout, teledynamics.

meetings occurred the interviewee was asked if it was acceptable to record the conversation so that an accurate transcript could be obtained. For the telephone interviews only the important details were recorded when possible. The use of the data divulged during the interviews was of concern as the confidentiality of the person and in some cases the company data was involved. Where allowed, the transcripts have been collated in the Appendix.

1.3.6 Timeline

A timeline of DEC was constructed using many various sources in order to identify the key products, people and events within the company history. This was used to understand when key people joined and left the company and look at the impact of the event.

1.3.7 Documentation and the Web

As mentioned earlier, Schein wrote a book on DEC primarily looking at what the management ethos and relationships were in relation to the company performance. Contact was made with Schein to ascertain whether he had any of the supporting documentation that went into some of the areas of his book. Unfortunately he had not kept any of the material or transcripts of conversations. Other books were used as sources for understanding of the technology path taken and also the management interactions that defined some of the product decisions and directions. Use was also made of the data and reports that were available on the web.

1.3.8 Conferences/Reunions/Dedications/Events

A number of conferences were attended to gather feedback on some theories and analysis of data during the period of the thesis as well as a number of articles generated. This enabled a strong grounding for some of the conclusions made and feedback from others observations was invaluable. As well as formal conferences, a number of re-unions and other events were attended to gather information and make contacts, many turning out to be of great benefit such as meeting Don Gaubatz. Some of the events attended were DEC employee reunions in Berlin and Reading, DEC enthusiast meetings where a presentation was made and the dedication of the Ken Olsen Science Centre in Massachusetts where it proved possible to meet some of the senior people involved in the company.

1.3.9 Strategy Documents

DEC strategy was analysed over the years to consider how the company had followed a strategy and if it had the correct strategy. DEC after Olsen struggled to define a company strategy, Palmer employing a number of external companies in an effort to deliver a cohesive strategy going forward. Kathy Hornbach of the DEC strategy group kindly donated her archival material from the period which gave an understanding of the turmoil the company was in during the 1990's. It soon became clear that DEC had struggled with strategy in the Palmer period and had commissioned many external and internal reports on future strategy with no clear sign that any had been followed.

Analysis was made of the relationship of product development versus the S-curve and wave theory of lifecycles in order to ascertain where the company went wrong in its direction.

1.3.10 Notesfiles

DEC had a product that gave them a real advantage over competitors in their VAXnotes application. Within the company there were many hundreds of different notesfiles pertaining to a wide variety of subjects both business and personal, most of which no longer exist in any form. The notesfiles were accessible from any Digital location worldwide instantaneously and were an excellent communication tool for discussions and also for product issue resolution giving engineers direct and immediate access to developers. DEC personnel were able to post notes and receive replies from anyone else in the company from field people to senior engineering folk and this was a real corporate advantage which was of immense help in dealing with customer technical issues for example. The notesfiles were moderated so any untoward discussion or comments were removed. One area of the company that gave a great insight into the products being developed and the feelings of the employees was the 'Digital' notesfile.⁵ This consisted of 5917 individual notes with associated replies on a multitude of topics related to the company, its people, its products and its business. The record of the 'Digital' notesfile was preserved by an ex-employee and made available via the web, but has since been taken down by HP security who considered it a security risk for some unknown reason. On 17th July 2010 Corporate IT Security Incident Response Team (CITSIRT) stating that "This data contains HP confidential information".

1.3.11 Archives

An obvious important source of information about any company is the company archives. Michael Mahoney knew this only too well and implored researchers to preserve company history of failing companies as, only too often, they get destroyed when the company fails. In the case of DEC it was quite a challenge to locate any archival material. Communication with Gordon Bell led to the Computer History Museum who had received a portion of the DEC archives, 700 linear feet out of a reported 3000 in the company archives. Further investigation led to the Ken Olsen archives maintained at Gordon College where many of Olsen's memos were stored in date order, offering a truly amazing insight into what he was thinking as he ran the company. Discussions with the DEC archivist and the HP archivist have not shed any light on where the remaining parts of the archive have gone. Again contact via the DEC Alumni provided some access to personal archives including strategy documents from the mid 1990's and also workstation archives. There is a large amount of DEC documentation preserved on the web, the main site being maintained by Al Kossow who now works at the computer History Museum and his documentation is referenced in many places in this thesis. The web site is www.bitsavers.org/pdf/dec and contains many DEC manuals and assorted

⁵ Digital notes archive found at <http://www.buschdorf.eu/vaxnotes/> last accessed Dec 2009

memos. A visit to the Computer History Museum was arranged with the archivist Paula Jabloner and access to DEC technical reports on product development and projected volumes was possible. Also at the archives there were many DEC video tapes of meetings and technical training. The shareholder meeting of 1997 was particularly important in the research to identify potential prior to the Compaq sale as was the DEC strategy meeting of 1996. A number of visits were undertaken to Gordon College as the Ken Olsen archives there had most of the internal memos that Olsen had sent during his time at DEC. Neither of the archives was catalogued so an index of the memos was made and copies created for further analysis at home. The memos indicated a leader whose senior management did not always comply with his requests, especially when budgets were concerned. Dan Tyman who is in charge of the Olsen archives was extremely accommodating, allowing unrestricted access to the archives on a number of occasions which proved invaluable once agreement had been obtained from Olsen's family.

1.3.12 Comparisons

Finally other comparable companies are compared to ascertain what they did differently to survive the troubled times of the 1990's and also what mistakes were made by those that didn't.

1.3.13 Product technologies

The technologies available to DEC have been analysed and their impact on the company direction assessed. More importantly the financial impact and the sales aspects have also been considered. DEC made some strategic errors in its product choice and direction in the 1980's which major consequences in terms of income, reputation and future growth, including personnel retention and the consequences of the loss of some key figures. Three major product developments that were extremely costly to DEC have been analysed.

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2. Rifkin, G. and G. Harrar, *The ultimate entrepreneur : the story of Ken Olsen and Digital Equipment Corporation*. 1988, Chicago: Contemporary Books. xii, 332 p.
3. Anderson, H.E., *Learn, earn & return : my life as a computer pioneer*. 1st ed. 2009, Redding, CT: Locust Press.
4. Goodwin, D.T. and R.G. Johnson, *The Demise of Digital Equipment Corporation: Downsizing - Cause or Cure*. Zeitschrift fur Unternehmensgeschichte, 2010. **Nr 1**: p. 82-99.
5. Brewer, R., ed. *Your PhD Thesis: How to Plan, Draft, Revise and Edit Your Thesis*. 2007, Studymates.

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