The Critical Success Factors in the Global Consumer Microprocessor Market: The Case of Intel vs. AMD examined

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Criam Padayachee
Abstract:

Society today is filled with one ubiquitous word and that is the microprocessor, also known as the CPU in more formal terminology. The CPU is pervasive in every form of electronic device from the LCD TV to the cellphone and it was the researchers aim to understand the global consumer microprocessor industry in the context of the two dominant companies which are Intel Corporation and AMD (Advanced Micro Devices). AMD started one year after Intel however in 2007 both of these companies have drastically different performances and it was the researchers aim to compare and contrast these companies in the light of the critical success factors that this industry requires.

The researcher defines success with reference to the semi-conductor industry as the positive progress made by a company in creating sustainable competitive advantage even if immediate profits are not realized. Critical success can then be defined as the factors of success that a company should prioritize in order to proceed in a constructive direction. With the critical success factors defined, the researcher determined that a mixed-method survey instrument would be used encompassing both qualitative and quantitative questions. The survey was constructed using the conclusions from the literature review and various polls in order for the most accurate survey instrument possible to be constructed. This survey was created online and received a total of 362 responses with 250 respondents making it to the end of the survey. The survey data was then analyzed whereby congruent responses were mapped onto a pie chart in order to illustrate the most significant factors with regards to the consumer microprocessor industry.

The analyzed data from the survey revealed that AMD needs to better manage its collaborators while paying attention to the consumer to ensure that they never underestimate the desires of the market.
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Chapter One
Introduction

1.1 The Overview of the Current Global Consumer Microprocessor Market

Futurists like Isaac Asimov, Robert Heinlein and perhaps even Gene Roddenberry were the first to imagine a future controlled by machines, and that is essentially what exists today. Processors drive our automated society and are essential in almost every popular consumer device such as Cellphones, PDA’s, MP3 Players and your LCD TV. 41 Years ago, Gene Roddenberry created what the world knows today as Star Trek, the world’s most famous science fiction show. This series started in 1966 and is still being shown on television stations around the world 41 years later because it has helped inspire the minds of generations to come. These generations have helped create the technological advances we take for granted today such as the LCD TV. Star Trek predicted the rise of the cellphone also known as the “com badge” and the essential nature of the computer. Often in the show, you will hear people asking the computer via voice activation to perform certain tasks which are done in seconds however we are a few generations from that sort of efficiency. This processing power is not a distant goal due to Moore’s Law which predicts that the numbers of transistors will double every two years on a processor (Moore 2003). The transistors are what give the piece of silicon that we call a processor the power to play games and send email. Eventually every person will have the equivalent of a supercomputer in their house automating tasks and responding to numerous other questions. This potential future could not be possible without the invention of the first single chip microprocessor by Intel Corporation in November of 1971. This processor was known as the Intel 4004 and was developed by a team of engineers who had no idea how important their invention would be to society decades later (Ceruzzi 2003).

Despite Intel having invented the very first processor in the world, they are not the only processor manufacturer in the modern world today. In the late 20th century, there were three manufacturers in the market with Intel clearly dominating but at the end of the century, Cyrix merged with national semiconductor and no longer participated in the global consumer
microprocessor market. That left AMD (Advanced Micro Devices) and Intel Corporation to battle it out for the consumer processor market.

AMD was founded in 1969 (AMD 2006) by Jerry Sanders who always maintained that “customers should come first, at every stage of a company’s activities.” It was that concept that allowed AMD to grow from an initially small market share to 23.3% of all processors shipped worldwide in 2006 (Krazit 2006). However, despite this significant market share gain, Intel still has what encyclopedia Britannica defines as a realistic monopoly whereby it is able to increase its price in order to maximize profits regardless of market conditions (Britannica 2007). This monopoly existed in part due to Intel having developed the first processor and having significantly more resources than AMD has retained at any point in history yet AMD has slowly but surely managed to gain market share against its larger competitor (Appendix 12).

1.2 Analytical Steps in Topic Discussion

This area of research was chosen because many of the mainstream technology writers, financial analysts and other media outlets have attributed the success of AMD or Intel to sheer technological innovation yet we know from companies like HP who used to focus on innovation that it is only part of a company’s success and definitely not the source of success for any company in the modern business era (Deshpande 2005). Some of the other areas that contribute to a company’s success include: marketing strategy, strategic management, partnerships with the big retailers and general consumer behavior. The previous areas of success are a statement of the researcher’s beliefs with regards to the general success factors for all organizations. Dr. Rosabeth Kanter recently wrote in the Harvard Business Review that “Every few years, innovation resurfaces as a prime focus of growth strategies. And when it does, companies repeat the mistakes they made the last time.” (Kanter 2006) This quote is an example of the competitive battle between AMD and Intel during the past six years. Using the above quotation as guidance for this exploratory study, the researcher will explore the strategies utilized by AMD and Intel in order to grow and succeed within the global consumer microprocessor market (GCMM). This research can be broken down into four other smaller
questions that will allow me to gauge the other contributing factors towards the success of both of these companies in the GCMM. These questions are:

- Is strategic management the key differentiating factor between Intel and AMD?
- What are the key success factors behind the performance gap between AMD and Intel? What differentiates these two companies in this regard?
- How significant a factor are consumer perceptions of the companies on the consumer processor marketplace? Do these consumer perceptions influence success?
- How can AMD grow its market share in the consumer market?

The researcher will answer these questions using academic frameworks combined with his own insight and analysis in order to comprehensively refine these questions into researchable form. This approach will allow me to evaluate the effectiveness of the current strategies employed by Intel/AMD and their overall success. Initially it is the researcher’s intention to examine the innovation concept again in a bit more detail before proceeding with a review of other academic concepts.

After a strategic innovation picture of these two companies is acquired, the next step will be to analyze the marketing operations with regards to the consumer. Selden and Macmillan developed a comprehensive process that will allow us to determine whether AMD or Intel truly have a customer centric approach which is a concept that they term as essential in the modern globalized business environment(Selden and MacMillan 2006). Lastly the various supplier, retailer and consumer relationships will be discussed using the analytical framework developed by Yoffie and Kwak. This framework will allow us to analyze whether the complementary relationships that exist between hardware and software manufacturers are being utilized in the most efficient way to deliver critical value for AMD and Intel.
1.3 Previous History of AMD and Intel

The researcher has chosen these pieces of academic literature to be the basis for this research in order to create a solid academic foundation from which to accurately answer the earlier research questions. At this point before delving further into a review of literature relevant to the topic of the success of AMD and Intel in the processor market it is essential to understand in brief what events have occurred in the last 6 years. AMD finally caught up to Intel when they released the first 64bit processor for the consumer market, months before Intel intended to released theirs in September, 2003 and consequently this processor defeated Intel’s Pentium 4 in subsequent benchmarking tests (See Appendix 1). Later on when Intel thought they would get the upper hand by releasing the first dual core processor (two processors on one chip) the Pentium D, AMD beat Intel again by releasing their X2 which defeated Intel’s Pentium D in all the relevant benchmarks (See Appendix 1). After two successive defeats Intel realized that unless they created processors that answered consumer needs, AMD would continue to defeat them in both the consumer and business market.

Intel defeated AMD in both the business and consumer market in mid 2006 with the release of their Core 2 Duo™ line of processors. Not only were these processors more efficient (See Appendix 1) than AMD’s, they also managed to compete on a power and cost basis at the same time. With that being said, the market is still pretty competitive for both AMD and Intel yet according to the Orange County Business Journal in California, Intel is not supposed to be fully being able to appreciate its success until mid 2007 due to the accumulation of unsold Pentium 4 and Pentium D chips (Womack 2006). This success can be seen in Appendix 12 where Intel has demonstrated record profits in the second quarter of 2007.

The most publicized facet of the successful processor market is the speed at which innovation has occurred. A new line of processors or even single products comes out at least every half year, in the last two years we have gone from a single core on a processor to four cores in 2007 but despite this innovation, the software applications to be able to use all this innovation are few and far between. Despite the lack of software to support these applications, consumers
continue to purchase brand new PC’s with hardware that at best minimally affects their day to day lifestyle (Goldsborough 2005). In the perfect world if we look at the PC market objectively we should see that consumers make purchases according to what they need as opposed to the best deal offered by the big three pc retailers in the world such as Dell, HP, and Lenovo.

A key facet of Intel or AMD’s success is their partnerships with the various PC retailers around the world. In the GCMM, a majority of the processor sales occur because companies like Dell, HP and Lenovo sell Laptops and Desktops to consumers. These retail companies are at the frontline when it comes to customer interaction and the bottom line therefore they are a key driver for AMD and Intel. Intel previously had a competitive advantage over AMD by partnering with Dell who is widely known as the largest PC retailer in the world. However in 2006, AMD announced a partnership with Dell that has essentially negated that competitive advantage and put AMD on equal ground with the biggest retailers of Intel based PC’s in the world(Edwards 2006). It is these partnerships with the big PC retailers that affect the bottom line of Intel or AMD as these retailers are the ones who market to the consumer on a daily basis; hence it is essential to examine consumer behavior. An understanding of consumer behavior will allow us to determine which complementary relationships are beneficial to AMD and Intel in terms of their success within the processor market.

Looking into consumer behavior, many psychologists will tell you simply that we as human beings are not rational people and are driven by our needs as stated by Abraham Maslow the father of behavioral psychology. In a pivotal paper on the managerial significance of behavioral decision theory, Itamar Simonson concludes that in some situations, consumers do have clear and strong preferences for particular products or service characteristics(Simonson 1993). This simple statement more than a decade ago indicated the increasingly important nature of consumer behavior theory and why business’ need to understand this theory in order to maximize success in their respective field.
Some scholars have criticized Maslow’s theories due to their vague nature and over simplification but at the end of the day, from a logical standpoint, human beings motivations have not changed that drastically and are essentially still the same as they were sixty-four years ago (Ewen 1980). Despite Maslow’s contemporary theoretical applicability, a more modern approach is still required as stated by Simonson who further states that companies can increase their sales significantly by supplementing the voice of the customer with the various “irrational” influences on purchasing decisions and translating that knowledge into specific sales, positioning, pricing, and communications tactics.

Lastly to round out the discussion around Intel and AMD with regards to their success in the consumer processor market, the researcher will be looking into the strategic management process and the marketing machines of both these companies in order to understand their places in the market. One of the most prevalent issues with regards to either company has been a delay in the launch of products, which is detrimental to any company in any industry (Rodda 1998). Intel enthusiasts will say the only reason AMD has done well so far is because of Intel’s mistakes with regards to meeting product launch dates. However meeting consumer expectations is just part of the problem and that issue may lie with the strategic management initiatives adopted by both companies. However sometimes it is not just about strategically managing your own company but rather about how to strategically manage your competition. The purpose of examining the management of your competition is the ability to momentarily slow your opponent or totally put them out of the game (Stalk 2006). The microprocessor market is more competitive than ever where the best strategy for a company like AMD would be to strategically manage the larger Intel Corp. in the effort to utilize their size and flexibility to gain market share.

There are numerous strategies and competitive advantages that a company can gain in order to achieve success in the consumer market place. In terms of AMD and Intel, due to the size of the market and there being only two competitors, these business strategies become even more crucial because one false move by either company can set them on the backburner in order to
catch up with the competition. The researcher’s purpose in pursuing this course of study as the has alluded to above is to explain the success of the only two companies in the GCMM in terms of business as opposed to innovation. After reviewing the current literature concerning the business aspects of AMD and Intel in chapter2, chapter 3 will discuss in detail the results of the survey instrument proposed in the next chapter. Lastly chapter 4 will begin with the conclusions of the research and will end with recommendations for future research. Combining the strategic, marketing, collaboratory and consumer aspects of this paradigm will allow us to determine whether or not there exists a set of characteristics that could be termed “critical success factors” in the GCMM. The next section will detail the methodology used by the researcher in order to determine the best approach for exploring this area of business.

**Research Methodology**

**1.4 Designing the Research Program**

Designing the most appropriate research program for this dissertation proved to be problematic for the researcher. The first issue that was encountered as stated in the purpose for this dissertation was that traditional research was based on the physical performance of Intel and AMD. These kinds of benchmarks though useful would not fall into the realm of relevant business research therefore a broader perspective is needed to comprehensively understand the global consumer processor industry.

The distinction must be drawn between Consumers and business’ here, Companies and Consumers purchase PC’s for very different reasons hence the multitude of Business CPU related research is also irrelevant and cannot be used to create a pertinent research program. The literature review (chapter 2) revealed five classes of consumers and their various adoption mechanisms in relation to technology however deciding between a qualitative and quantitative methodology would prove problematic due to the mixed nature of this subject and the research question.

Maylor and Blackmon compiled a very concise summary (See Appendix 6) of the two different approaches and their various aspects in their book, *Researching Business and*
The researcher must note that the book caters specifically for business related research hence the provided summary may be simplistic but it carefully accounts for all the questions that could be answered in any potential business scenario.

The potential scenario within the scope of this paper is the critical success factors in the global consumer microprocessor market. Before the research question can be understand, the relevant linkage must be established between the topic and the research question. There are numerous definitions of success hence quoting or referencing a single definition would defeat the validity for this paper since success could be argued from numerous perspectives. The researcher defines success with reference to the semi-conductor industry as the positive progress made by a company in creating sustainable competitive advantage even if immediate profits are not realized. Critical success can then be defined as the factors of success that a company should prioritize in order to proceed in a constructive direction. The processor market is inherently global in the consumer context because Intel and AMD are the only two competitors who supply the pertinent retailers with their products.

Thus it can be concluded that the main aim for this research is to discover the main influences behind the purchase of a particular PC by a consumer and the relation of this influence to the critical success of Intel and AMD. Though it was the researcher’s intention at the beginning of this research to consider the business perspective, the subsequent literature revealed the following contradictory discoveries from a theoretical standpoint:

1. The industry is highly competitive and the products are technologically advanced yet both companies have fallen back on price competition in order to generate profits. Price cannot be a consideration for the average consumer because it is at the retailers where the products with the processors are bought. Therefore it is the retailers that endure the immediate costs for the processor with the consumer dealing with the initial cost and the markup. Consumers cannot appreciate a significant price cut because the retailers decide the spread of products and what processors go inside. Looking at Appendix 5, there is no significant price differential between AMD and Intel based retail products hence price cutting is a flawed and inconsequential strategy.
2. The rate at which processors are released is only increasing despite the lack of software support for multi-cores and the benchmarks stating that consumers do not need the latest generation of processors. The innovation strategy adopted by AMD and Intel is illogical from a business standpoint hence it cannot be a factor for success within this industry because this innovation is not targeted at their customers.

3. The literature suggests that customer centricity is critical to any business in the modern globalized business environment yet as established in the above point, Intel and AMD are both pushing Quad Cores on the average consumer. Customer focus has been lost by both of these companies yet Intel in its 2nd Quarter 2007 has recorded significant profits therefore this theoretical base is invalidated. Despite the lack of customer focus, Intel and AMD are still able to generate profits therefore customer centricity from a business standpoint is irrelevant.

4. First Mover Advantage has also been a popular theory employed by the academic populace to explain the success of company over another yet as proved in the literature review it does not apply to the CPU industry. The GCMM is so fast moving that companies willing to invest in FMA would not garner the traditional advantage thereby negating the invested resources which could have been used in a more profitable manner.

With the majority of the business perspective of this research obsolete it became increasingly aware to the researcher that the only valid perspective is that of the consumer. The consumer’s purchases determine the success of either of these companies hence it is the processes behind these purchases that must be studied and understood. With the consumer purchase decision process as the focus of this research methodology, we can therefore use the marketing theoretical base as a platform from which the consumer perspective can be researched.

Philip Kotler once said: “Marketing takes days to learn. Unfortunately it takes a lifetime to master.” Kotler made this reference in regards to people however this can also apply to companies like AMD and Intel. The researcher herein states that the focus of this paper from this point is the consumer purchase process and the related marketing perspective however this is possibly where we can differentiate between AMD and Intel. Intel has been inundating the media for years with the campaign “Intel Inside” while AMD on the other hand has marketed on a limited basis and relied more on word of mouth. Word of mouth can be powerful however a good marketing campaign can turn a company around as demonstrated by
the reign of Carly Fiorina the former CEO of HP who turned the company around by realizing $3.5 billion dollars in cost savings by 2004 and consolidating HP’s marketing into a single unit (Deshpande 2005).

1.5 Explanation of the Primary Research Question

With marketing established as a critical success factor along with consumer purchasing behavior, the original research question established at the end of the Literature review can be reevaluated:

1. How significant a factor are consumer perceptions of the companies on the overall processor marketplace? Do these consumer perceptions influence success?

Consumer behavior is often associated with Qualitative methodology however as stated in the Maylor and Blackmon summary this only answers the questions of “why” and “how”. These types of questions would only partially answer the question at hand therefore a mixed approach was adopted by the researcher in order to obtain results that cover the full realm of possibility while allowing answers that are statistically significant. The researcher than decided that the research process would be a mixed method online survey encompassing both quantitative and qualitative questions in order to receive the most pertinent data to the question at hand.

The combination of these two methods would allow the researcher to establish with some level of authenticity the results achieved by either research method in order validate this research paper. The researcher’s initial inclination was to create an online questionnaire because the speed of data collection and survey response rates are unparalleled compared to regular paper questionnaires (Dillman 2007). After an extensive examination of the various online sites that allow surveys to be hosted for a fee, it was decided to use http://www.group-surveys.com/asp/common/default.asp due to the security mechanisms and simplified coding to ensure an innovative but secure survey. The researcher than proceeded to create the relevant questionnaire as stated above however after numerous attempts it was decided that a trial
running a single question would provide the guidance in order to create the most appropriate questionnaire.

Social networking has been highlighted in the media over the last two years, particularly with the purchase of MySpace by News Corp. for $750 million dollars but recently Facebook.com another popular social networking site has allowed third parties to use their 20 million users for market research. With this amount of people combined with the cost of 10c per response, the researcher posed the question “Does the CPU inside your computer influence your purchase?” Immediately the use of this unconventional mechanism draws some academic questions concerning the validity of the data even as a guidance tool. The mechanisms within the Facebook ensure that only one answer can be submitted per Facebook account hence there is no chance that a single person can submit multiple responses. Another potential question might be the lack of truth behind user data in terms of age and sex however the same questions could be said for paper questionnaires. From the researcher’s perspective the only potential issue could be the lack of people in the 35 – 49 year category which as can be seen in the data numbers only 6 people out of 200 respondents polled(See Appendix 7). The decided lack of people in that age group is representative of sites like these and could possibly hamper the significance of the results as guidance for the complete questionnaire because adults in this age segment traditionally have more income than people younger and would fall into the pragmatists through skeptic’s categories.

Despite the lack of 35 – 49 year olds, and due to the nature of this simple poll, these results are significant because they are just a guide and will allow the researcher to compile the most appropriate questionnaire to suit the research question. The results of the poll indicate categorically that 39% of respondents out of the 200 do not care what kind of processor is inside their CPU. This answer is not what the researcher expected due to his technical background however this further reinforces the notion of the pivotal role of marketing as a critical success factor in the GCMM.
1.6 Preliminary Survey Construction and Issues

With the Facebook data guiding the researcher, a questionnaire comprising of 15 questions was drawn up and then trial run online with some mixed response from the ten people who answered the trial. Some members of the trial sample suggested the questionnaire was too short and did not explain adequately the point of the survey. Other respondents said some of the questions were hard to understand and that double meanings could exist. After the first trial, it was suggested by the researcher’s PC enthusiast friends that he find similar questionnaires out there that discuss AMD and Intel from the consumer perspective.

With that feedback in mind, the researcher set out to discover if any research in the form of surveys, questionnaires or polls had been done with AMD or Intel. The conclusion of that search was that there were no academically supported surveys or even polls concerning the subject however there were some polls scattered about the World Wide Web. The most promising was a yearly poll conducted by Neowin.net regarding which direction the polled user leaned (AMD or Intel?). The results of the polls (See Appendix 8) for 2005 and 2006 both indicating that AMD is preferred by the sites users for their processor purchase. It must be said that Neowin’s audience would lean to the more technical side of computing but that just means they would fall into the category of technology enthusiasts within Chintagunta’s five categories.

Technology enthusiasts would hardly qualify as the average consumer hence the above Poll can only be a consideration in the mind of the researcher. The Neowin poll also highlighted the common human trait of the average consumer supporting the underdog in a given situation. This is particularly true when it comes to the technology arena with people who are quite technologically literate supporting Linux in the Linux vs. Microsoft Windows debate or people supporting AMD in the AMD vs. Intel debate. Sometimes this loyalty runs so deep that people confuse loyalty with practicality in the sense that they will continue to use AMD despite the fact that Intel Core 2 Duo™ processors are better than the AMD Athlon™ X2. This loyalty is a key aspect of any consumer product and no doubt plays a role in the success of both of these companies in the GCMM.
Even after running the trial question and questionnaire, once the researcher started to create the survey on the website group-surveys.com, he discovered that the hardest aspect of using the online questionnaire method was the actual programming of the survey. Group-surveys allows the creator of the questionnaire to embed what is known as “skip-logic” within the questionnaire. Basically this allows the creator of the questionnaire to only permit certain people from the sample population to make it all the way to the end of the survey.

This is part of the purpose of “skip-logic” while the other part of the process is to create a metaphorical tunnel for respondents with certain answers to proceed down a certain path in the questionnaire. Let us look at the example of price as being one of the deciding factors when it comes to purchasing Laptops or PC’s: if the respondent chooses the option of price, he would then be directed to a question on the survey that further explored that issue. However if another respondent chose the option that he was influenced by the promotional advertising when deciding what kind of laptop or PC to buy, he would then be taken to a totally different section of the questionnaire exploring the issue of advertising and marketing as related to the research as a whole.

This component within the Group-surveys website was very useful on the face of this discovery by the researcher however programming the website and the survey to operate in a flawless fashion proved to be difficult at best due to the fact that the survey construction and programming was done through the web which determined the speed of progress by how fast the researchers and servers internet connection was. Once the survey creation was underway and the survey grew from a mere 5 pages to 18 pages in length, it was taking the website longer and longer to refresh the data every time a minor change was made. This hurdle was cumbersome but eventually it was overcome once the researcher completed the construction of the questionnaire and the accompanying skip logic statements.

With the completion of the questionnaire and the testing of the “skip-logic” to ensure that any potential respondent would be able to make it all the way through without any glitch, the researcher then needed to decide how to deploy the questionnaire to achieve the broadest spectrum of response encompassing all of Chintagunta’s five categories of consumers.
After much deliberation on the issue of choosing the correct population, it was decided that a worldwide dispersal would be necessary in order to gauge within reasonable certainty the success factors consumers contribute to the GCMM. This meant that the link to the survey would have to be posted at numerous sites online or even personally emailed through the researcher’s own personal contacts. The technology enthusiasts would be the easiest people to acquire as the internet was built by this sample hence a large majority of people that visited the various forums around the internet could be termed technology enthusiasts. The researcher would be hard pressed to gather significant enough respondents in the other categories hence these categories might have to be gathered personally through individual email invites for participation in the survey.

Another issue when it came to survey distribution lay in the posting of the survey link on certain sites, group-surveys.com has a free account whereby the user can receive 100 responses but after the comprehensive literature review, it was decided by the researcher that 100 responses would be far too few and would not allow a significant number of respondents to be collected in order to claim statistical significance. Group-surveys allowed an account upgrade for the price of $15 which allowed 5000 responses which was deemed by the researcher as more than enough to cover all the possible categories of average consumers.

Collecting the responses for the technology enthusiast category would prove to be quite precarious since posting a link in a forum on a website that is heavily populated might complete all the responses relatively quickly. After numerous trial runs with the completely created survey on group-surveys.com, it was calculated by the researcher that the average person would take anywhere from five to seven minutes to complete the survey dependant on the length of their answers, time taken to read the questions and understand of the topic in general.

With the completion time of the average user being relatively short, the researcher realized that there was a very real possibility that the 5000 respondent quota could be filled up relatively quickly hence the need for accurate sampling became very urgent. Eventually it was decided that the link for the survey would be posted on www.wulfram.com, a primarily gaming
site with a small technology enthusiast committee that on any given day only a handful of people visit the site and this would ensure that just the right about of technology enthusiasts respond to the survey.

The remainder of the different categories would be collected using personal email invites combined with posting the link to the survey on a website like www.worcester.edu which was the previous school where the researcher completed his bachelor’s degree. Worcester State College has mandated for the last 3 years that incoming freshmen into the college own a laptop hence this forces a wide variety of people to purchase laptops that meet a certain standard as specified by the school. Between personal invitations, wulfram.com and Worcester State College, the researcher believes that he can receive the maximum amount of correspondence in the shortest time while still maintaining the authenticity and integrity of the results achieved.

Authenticity has always been an issue when it comes to online surveys due to the potential for fraudulent responses which are usually mitigated in the physical survey collection procedure. The researcher mentioned facebook.com above as only allowing one response per account when it came to polls however it must be said that the researcher has no such capability with group-surveys.com. Even without that ability though, group-surveys.com can ensure that only a single person from a specific IP address can respond to the survey, this achieved through group-surveys own respondent tracking system that can ensure the validity of the results achieved. If the situation does occur that the researcher receives multiple responses from the same IP address, these responses can be dismissed and invalidated hence preserving the integrity of the study.

With the respondent sample classified, the survey construction completed and the various security mechanisms put in place, the only step left was to activate the survey online. Once the survey was activated, it was just a matter of waiting for the data to be collected and generating the reports online through the group-surveys.com website. The responses as mentioned earlier would also have to be periodically monitored to ensure that no single person could submit multiple answers. Once this security monitoring was in place, the next step was for the researcher to wait for a significant amount of data to be collected.
Chapter Two

Literature Review

2.1 The Global Consumer Microprocessor Strategy

There are very few pertinent academic articles concerning the success of either of these companies hence it is necessary to rely on consumer magazines, websites and other non-conventional media in order to gain the most accurate understanding of the market. In the modern mainstream enthusiast media scene, websites like tomshardware.com and anandtech.com frequently and allegedly give unbiased opinions regarding the success of Intel and AMD yet these websites are most noted for giving a very technical view regarding innovation concerning the product offerings of AMD or Intel. A good example of such an article is by Patrick Schmid and Achim Roos of Tomshardware who recently looked into AMD’s recent fight to retake the PC enthusiast market(Scmid 2007) after Intel pulled the rug from underneath them with the release of the Core 2 Duo™. This article goes into detail with regards to processor performance benchmarks on various applications as well using terminology that would not be accessible to the average individual. These kinds of articles are relevant to the topic at hand but they are not the major deciding factor in the research process as this is the kind of information we are hoping to expand on from a business perspective.

Within the introduction it was the researcher’s stated intent to analyze the industry and these two companies in the business consumer perspective while veering away from the traditionally technical analysis that dominates the media today. This analysis therefore required a breakdown of the various factors, concepts and theories within the business world that could possibly apply in this situation and more specifically the global consumer processor market. A complication that was not foreseen by the researcher was the pace at which the processor environment changed on a daily basis as reported by the media. After a list of ten broad aspects was drawn up, the researcher eliminated three of them within the writing process.

After removing these three aspects from the list of factors to consider while evaluating success within the confines of the consumer processor industry, the following factors were left for the
literature review: Business Strategy, Innovation, Customer Focus, Complementary Relationships, First Mover Advantage and Consumer Behavior. Before any examination of the relevant business literature can occur, we need to understand the strategies and positions of AMD and Intel within the market. Within the introduction preceding this section it was stated that Intel is currently leading the consumer processor market due to their innovative Core 2™ processor line. Intel has adopted a customer centric strategy to align itself with AMD’s pre-existing customer focused strategy in creating its current series of processors. The future of the processor industry is veering away from a customer centric strategy as stated in the following section concerning innovation.

A customer centric strategy is a strategy without a doubt but this should be seen under the umbrella of the strategic management initiatives adopted by these companies. We need to understand these strategic initiatives in the context of critical success factors, Johnson and Scholes argue that critical success factors are underpinned by core competencies. For example if first to market advantage is required, it may be underpinned by core competencies in the logistics and negotiation skills with key account retail outlets (Johnson and Scholes 2002). Johnson and Scholes go on further to state that core competencies change over time however within the consumer processor market we can logically state that AMD and Intel both have competencies in:

1. Research and Development in order to come up with the new processors that society demands
2. Logistics in order to ensure that the retailers of Laptops and PC’s receive adequate product to construct the machines that consumers will finally purchase
3. Marketing is essential so that consumers are aware of your product and its various contributions to the consumer lifestyle.

These core competencies are further reinforced by a model that Johnson and Scholes use to illustrate the changes of core competencies over time:
Within the global consumer microprocessor market we can see that AMD and Intel differentiate at multiple steps in this diagram. Firstly we know that Intel has more fabrication facilities than AMD therefore giving them a greater access to markets (SIA 2007). Secondly we know that only until recently has AMD had the same access to retailers as Intel has had with companies like Dell only recently electing to sell AMD based machines. Lastly we know that Intel has a significantly larger marketing budget which can be seen in Appendix 12 therefore allowing them the ability to reach the largest number of consumers possible.
The above diagram allows the researcher through its analytical steps to determine the strategic differences between AMD and Intel. These strategic differences are underpinned by identical core competencies which leads the researcher to believe that strategic management is a potential issue concerning these two companies in the GCMM. Strategic management may be an issue but the above diagram can be criticized for not illustrating the inter-relations between various factors which could prevent a concrete analysis being done on AMD and Intel (Jonker 2004). Regardless of the academic model, the researcher contends that the different ways Intel and AMD manage their resources is indicative of their relative success in the consumer marketplace. This success cannot be completely understood without evaluating the key component of the GCMM which is innovation.

### 2.2 Is Innovation the Key to Success?

Innovation is a word that has increasingly characterized the dynamic business environment that we find ourselves in. Business’ of various sizes are increasingly pressurized to be innovative as well as cost cutting in order to maintain profit margins and open up new markets for the company. An innovation centric strategy is not without its pitfalls as shown by Dr. Kanter who mentions that in order for Innovation to truly work within a company there needs to be a few core principles at work:

- Expand the search for new ideas within a company; idea generation should exist at all levels within a company and not just the engineering team or the marketing team. Combining creativity from all levels within a collaborative environment will only add value to the company’s processes and increase revenue for the company in the long term.

- Expanding the search for ideas needs to be combined with a flexible organizational structure; great ideas are lost within companies due to an organizational structure that destroys ideas before they can make it all the way up the chain of command. A flexible organizational structure aids creativity and ensures that all ideas are looked at within the company giving the organization the most opportunities for expansion.

- The 21st century has given rise to improved collaboration tools that do not cost the company a single cent therefore there is no excuse for employees within the
company to not collaborate on projects thereby increase the value of the project due to the increased perspectives.

Organizational Structure, Idea Generation and Collaboration are just some of the major tools that companies can use in order to ensure that innovation is implemented correctly within the organization(Kanter 2006). Dr. Kanter provides some interesting insights into the innovation process but in the context of Intel and AMD we can see that she forgets to discuss one important aspect of innovation which is the target of the innovation. Innovation is a strategy employed by companies to achieve a goal which for most companies involves creating a new product category or market. This innovation strategy in the 21st century consumer environment does not hold up and has increasingly led companies astray creating the belief that consumers will buy a new product as soon as it hits the market due to its improved efficiency and return on value.

We can see this innovation strategy at work within the consumer microprocessor market as Intel and AMD continue to release new processors at an astounding pace with Intel having released its quad core processor in the first half of 2007(Ames 2007). This product was released just a mere 2 years after the introduction of the first dual core Pentium ship in the spring of 2005. AMD have followed suit as always with the planned release of their Quad Core chip in August of this year. Within two years, both these companies have managed to double the amount of CPU’s on a single processor without most consumers being aware that the majority of software out there does not support more than a single CPU(Gookin 2006).

### 2.3 The Customer Centric Approach

These rapid product releases are where both of these companies are dangerously tethering on the edge of releasing products that consumers do not desire and that fact could be disastrous in the long-term for Intel and AMD. Selden and Macmillan write that the frontline employees need to be the ones at the heart customer R&D process however neither AMD nor Intel operates their own retail stores(Selden and MacMillan 2006). Selden and MacMillan go on further to explain that companies like AMD and Intel need to develop a deeper understanding
of their customers before they decide to innovate as this understanding will allow them to
deliver products that create value for their customer and in turn the shareholders of the
company. The problem is therefore twofold for AMD and Intel, how do they create products
that the customers desire without actually being in contact with the customers at the point of
sale? This is where the internet comes in and where recently developments in CRM software
allow companies like Intel and AMD to see how well their processors are doing with a few
simple clicks. The information garnered from their retail partners can then be passed down to
all levels within either company so that there is an acute awareness of the status of the current
product lines.

With the frontline customer problem solved, let us employ the framework suggested by Selden
and Macmillan in order to determine whether AMD or Intel fall short in employing a successful
customer centric innovation strategy. This framework involves five steps or three phases:

• (1)Current Segments
  o Identify and develop the needs of core customers

• (2a)Extend Capabilities
  o Extend existing capabilities to attend to the needs of core segments and sub-
    segments

• (2b)Extend Segments
  o Identify halo segments that are similar to core customers and that can be
    served with very similar capabilities

• (3a)Stretch Capabilities
  o Identify new capabilities that attend to the needs of other life capsules in
    existing segments, sub-segments, or new halos

• (3b)Stretch Segments
  o Identify new segments unrelated to the core but where current capabilities
    can be deployed
The first phase as used in this model is our first step in assessing the true nature of the customer centric innovation strategy used by Intel and AMD or lack thereof. AMD’s founding principle has always been customer centricity (http://www.amd.com/gb-uk/Corporate/AboutAMD/0, 51_52, 00.html) which is why they have slowly been chipping away at Intel’s market share in the consumer and server market over the last few years and this fact is further echoed by the online forum war between Intel enthusiasts and AMD enthusiasts. AMD enthusiasts asserting that their processors are a lot cheaper and offer better performance for the price while Intel enthusiasts usually fall back on the old adage that the new comer is never as reliable as the market leader. This old argument has changed in recent years with Intel focusing specifically on consumer needs and releasing the Core 2 Duo™ line of processors that hold the market advantage until this very day. The last few years within the consumer pc market is evidenced by the increased focus on consumer needs in part with the release of more energy efficient and capable processors that allow consumers to multi-task without any problem.

A preliminary glance at Phase 1 of Selden and Macmillan’s model would lead the average consumer to think that the introduction of the quad-core from both AMD and Intel to be in the interest of the consumer however this is where we can conclude that this is merely an attempt by both companies to leverage the media coverage on dual core and expand it to the quad-core relying on the fact that the average consumer (See Appendix 3) will think “the more the better...”. Selden and Macmillan use the phrase: “Having identified this core, the customer R&D team then systematically identifies sub-segments, sharpening the alignment between customers’ desires and the company’s offerings and generating additional profits.” Both AMD and Intel have definitely not aligned their offerings with customer desires because as stated earlier in this paper, the software still has not caught onto 64bit processing yet alone dual core computing. Quad core processors are a great addition to the world in terms of innovation but in this day and age where consumers are increasingly becoming more fickle in terms of price and selection, companies need to tread a very thin line between product innovation and customer centricity. The remaining analysis using Selden and Macmillan’s framework is redundant due to the current nature of CPU market (innovatively centered) but it is the
researcher’s final conclusion that both companies are heading into dangerous territories pushing products that consumers do not need and that might create a backlash that neither company will expect.

2.4 How to Manage Business Collaborators

Summarizing our analysis so far, we know that strategic management is a key factor that differentiates AMD and Intel at the organizational level. Innovation as a strategy for companies is only viable if it is utilized in the context of consumer desires. AMD has always had consumer’s needs and desires in their sights since the company’s original existence and later on Intel has also adopted a customer centric approach. This approach has ended with the release of Intel’s Quad Core and AMD’s Quad Core in August however the next step of our analysis will commence. The researcher has previously spoken of the symbiotic relationship between software and hardware therefore the next analytical step would be to analyze this relationship. In order to truly be successful in terms of their new products, AMD and Intel need to manage their Collaborators or basically the people who produce the software that uses their CPU’s. This management process is highlighted in the HBR article entitled “The Art of Managing Complementors” whereby the researchers provide an in-depth analysis of competitors and suppliers (B. Yoffie and Kwak 2006). Using the principles of this article we will discuss the relevant factors in the complementary relationships between Intel, AMD, Microsoft and other software vendors.

Software and hardware have had a tumultuous relationship because of their mutual interdependence however the situation has changed in recent years with hardware exceeding the capabilities of software as opposed to the old days where software exceeded hardware. This situation has shrouded the consumer pc market in a shadow of confusion because enthusiasts frequently advocate the latest hardware however they fail to take into account the needs of the average consumer.

Enthusiasts reading this paper may rebel against the idea that the average consumer does not need Quad Core performance but unfortunately that is the hard truth at the end of the day. An article written by Jason Cross of ExtremeTech highlights the enthusiast viewpoint for Quad Core
by mentioning the ever increasing need of multiple cores for coding, video-encoding, gaming and general multi-tasking(Cross 2006). Cross uses benchmarks that the average consumer does not need to consider or will ever use. Coding refers to people who write computer code and the average consumer goes online to check his email, the weather and maybe do a little bit of shopping. Video-Encoding is always a big justification for multi-core processors and this is a fact that is not in dispute because the nature of the process requires as many Threads as possible to ensure the expedient encoding of your selected video. Encoding video is not the easiest thing in the world to do as demonstrated by numerous forums that are online and does not fall into the realm of the average consumer. Lastly gaming on the PC is an expensive hobby and it is cheaper to buy a $700 PS3 than a $2000 PC that does the same thing.

Further emphasizing the fact that consumers will not notice the difference from a Dual Core to a Quad Core is the latest series of CPU Charts released by Tomshardware.Co.UK(Schmid 2007). In this release, the benchmark all the latest CPU’s using a variety of applications. The researcher has decided to incorporate two critical benchmarks into the literature review (See Appendix 2). These benchmarks relate to tasks (HDTV Playback and AVG Virus Scan) that average consumers might perform in their usage of their PC or Laptop. Looking at the HDTV playback benchmark we can see that the difference in CPU utilization is minimal at the top end of the scale in terms of the Intel Dual Core and Quad Core processors. The difference between the Core 2 Quad™ 6600 and the Core 2 Duo™ 6600 is 21.5 percentage points which is something that the average consumer will not notice in his or her day to day tasks. With the increasing size of hard drives within Laptops and PC’s, a fast virus scan is essential and this is where the AVG Virus Scan benchmark reveals the truth. Referencing the Core 2 Duo™ 6600 and the Core 2 Quad 6600 there is only a difference of 3 seconds. 3 Seconds is a minimal time delay that even the strictest of Hardware critics could not quibble at.

It must be noted however that these benchmarks are only as reliable as the software that runs them and that is to say not very reliable. Earlier in this paper the researcher mentioned that one of the reasons that the average consumer does not need a Quad Core processor is because the software that utilizes all 4 cores efficiently is minimally developed that this obviously poses
a problem when using benchmarks to prove whether Quad Core’s are a viable new product for AMD or Intel. However the lack of software support in itself is a telling tale of bad management of Complementors.

The biggest Complementors in terms of the global consumer microprocessor industry would have to be Microsoft. Their operating systems (OS) are run by the majority of consumers around the world with the biggest PC manufacturer in the world (Dell) only starting to sell Desktops with Linux another popular OS. Operating Systems are the core of any Laptop or PC system and in order for these systems to run efficiently, they need to be optimized for multiple cores. Optimization is part of the issue however marketing would be the other half of the equation, if Intel and AMD both allied themselves with Microsoft in such a way that when an OS is marketed, so is a slogan that says “Works best with Dual core or Quad Core.” This kind of advertising would not drive major sales of multi-core processors but set the stage for informing consumers about the benefits of Quad Core over Dual Core.

Yoffie and Kwak use two terms in their discussion on managing Complementors called “Soft Power” and “Hard Power.” They then combine these terms in the conclusion of their article to create the term “Smart Power.” Smart power is the ability to utilize the various skill sets of a company in order to create benefits for both companies in a complementary relationship. Reverting back to AMD, Intel and Microsoft: An OS will not run without A CPU and a CPU will not run without an OS. This kind of symbiotic relationship would normally benefit companies in other industries but due to the fast paced and competitive nature of semi-conductor industry, the benefits of cooperation are lost on these three companies. AMD and Intel could utilize “Smart Power” here to better manage large software manufacturers like Microsoft so that they could roll out products that are fully supported by Large Software Makers. This kind of cooperation would benefit the consumer and the companies involved thereby creating added value at multiple levels.
2.5 The Truth Behind First-Mover Advantage

The next literature hurdle to discuss after considering strategic management, innovation, customer centricity, and complementary management is first mover advantage. First mover advantage has been argued as a fact and business myth but we can see in the PC industry it is a myth. We can see that by Intel releasing the first Dual Core Chip only to be beaten by AMD releasing a better Dual Core Chip (X2 Series). An even more pertinent example is Intel releasing the first Quad-Core processor with AMD’s Quad-Core most likely to outdo Intel’s 4-core offering if the media hype proves to be accurate. Within the consumer processor industry we can than conclude that first mover advantage does not apply due to the macro environmental factor of the pace of market evolution.

This pace of the market is a very succinct concept when referring to the semi-conductor industry due to the fact that we as consumers have experienced a massive increase in processing power since the dawn of the first computer chip. Intel has even suggested at the announcement of their development of the first 80-core chip that consumers can expect to have 80 cores in their home computers in 8 years (Robertson 2007). Suarez and Lanzolla provide a comprehensive review of existing FMA literature and come up with a modern model of FMA that can be applied to the processor industry. This model (Suarez and Lanzolla 2007) takes into account the theoretical foundations of FMA and what they refer to as “FMA Enablers”: 
Utilizing the above model we can see that FMA would apply to Intel and AMD if the pace of market evolution and the pace of technology evolution did not mitigate competitive advantage within 4 years (Mansfield, Schwartz et al. 1991). This empirical study used in the Suarez and Lanzolla paper is definitely not up to date but it can be said through deductive logic that this 4 years is probably a lot less considering the pace of expansion within the consumer processor industry. That being said we can draw the following conclusions that due to the lack of FMA, Intel and AMD are forced to continuously innovate in order to maintain profit margins.

Whether this is true or not remains to be seen and is beyond the scope of this paper but that might be an idea for future research. This evidence casts a contradictory light on the previous innovation article by Dr. Kanter who stresses that innovation needs to be centered on the consumer. Intel and AMD continue to innovate at increasing speeds yet they remain respectively successful. What does this mean? From the researcher’s exploration so far it seems to lead to the consumer perspective and why they continue to purchase PC’s with processors
that they do not need? This question will be answered in the following analysis and discussion section after the relevant data has been collected.

Lastly we can see that FMA according to Suarez and Lanzolla’s model cannot exist unless companies like AMD and Intel can create products that give their competitors sufficient trouble so that the length of time to imitate can be significant enough for significant profits to be garnered. Further evaluation of FMA literature is redundant at this point due to the comprehensive nature of Suarez and Lanzolla’s study therefore the consumer perspective can be analyzed next in order to understand why consumers purchase certain products. This understanding will further refine the issue of strategic management, innovation, customer centricity, complementary relationships and FMA in order to determine whether the interplay of these factors has an impact on what products the consumer will purchase at the end of the day.

2.6 End-Consumer Rationale and Behavior

Throughout the paper we have used the term the “average consumer” in order classify the general population that purchases Computers and this definition can be found in Appendix 3. Due to the nature of this paper it is necessary to adapt Everett Rogers classes of consumers to suit the modern context of this study. Rogers came up with innovators, early adopters, early majority, late majority and laggards as the five classes of consumers in 1962. The basic model holds true till this very day but unfortunately life has become increasingly complex hence a more modern series of classifications needs to be used. Pradeep Chintagunta (Professor of Marketing) in a lecture during 2002 used a technological adoption model entitled “The Chasm.”
We can see that he still uses five categories but instead changes the words so that they are more suited to the technological context of the society that we live in today. Applying this model to the PC industry we can easily see how the average consumer can be further broken down into various categories. Everyone within their social group knows someone who can be termed as a technology enthusiast. This person will purchase the latest audio creation, processor, television the day it is released. Visionaries are the close friends of enthusiasts and they are the ones who convince other people that a piece of technology is worth their adoption. Pragmatists are people who understand the need for modern technology in their lives but they are discerning shoppers and only purchase products that show a clear path of adding value to their lives. Conservatives are the second to last switchers in the technological cycle because they believe the current technology works fine therefore there is no need to purchase new technology. Lastly skeptics adamantly refuse to purchase new technology until the very moment their electronics at home fail.
Professor Chintagunta’s categories of consumers are by no means gospel but they generally cover all the types of consumers when it comes to technological adoption. In this paper we will refer to technological adoption as the process whereby consumers purchase new pc’s with new processors. With the consumer categories refined, the next step in understand purchasing behavior is to understand why consumers purchase certain products at certain times. Maslow’s model was discussed earlier and is the foundation for all consequent consumer behavior research however the modern consumer has a myriad of choices at his or her finger tips hence this decision is much more complex.

Less than a hundred years ago, the choice of products when it came to any industry was slim as the world and industry in general were still developing. Globalization and economic integration has forced companies around the world to expand product lines, continuously innovate and lower costs in order to remain competitive. All of these factors have benefitted the world despite the various anti-globalization protests that have been going on since the dawn of the concept. Globalization has therefore caused the multitude of choices that we as consumers are now faced with; further compounding these choices is the internet which allows us to research products before we buy them. This research has forced companies to make better and more well designed products because companies like Intel know the effect of bad PR.

An example of an online catastrophe by Intel occurred during 1997 when a professor of mathematics found a glitch in Intel’s Pentium chip. He discovered that the mathematical functions for the chip’s complicated formula were not consistently accurate. The professor decided to send an article about his findings to a small academic newsgroup. Word spread through the university community and the editor of a trade title caught hold of the story. The general press then reported the professor’s findings and sought Intel’s response. Intel denied any major problem, declaring it would only affect a ‘tiny percentage’ of customers. They failed to take responsibility or replace the affected chips. The issue grew online, as it became a key topic in an increasing number of online discussion groups, which kept on feeding the offline media. Intel’s share value dropped and it was only when IBM’s declaration that it would not use
Intel chips in its computers made the front page of the *New York Times* that Intel went back on its previous position and agreed to replace the chips (Haig 2003).

### 2.6.1 The IBM CDP Model

The above example clearly demonstrates how aware consumers are of the products they purchase. This awareness has created numerous problems for retailers and manufacturers alike in trying to understand the motivations behind a purchase in the 21st century. The five new categories of consumers that we just discussed are not enough for a company like AMD and Intel to strategically plan their marketing campaigns or even product lines because human beings by their very nature are infinitely complex. After much research it was discovered that IBM has created an amalgamated model of consumer purchasing behavior that in the researcher’s belief could comprehensively provide a modern description of the consumer decision making process.

The first question on any companies mind when trying to create a competitive advantage is why a consumer would buy from them as opposed to their competitor. This consumer insight allows the company to create products and marketing strategies that will eventually increase the revenue for the company. Revenue growth is increasingly a difficult sustainable mechanism in the 21st century global business environment due to the increase competition from globalization factors.

Saint-Onge and Armstrong echo the need for customer understanding in their book *The Conductive Organization* (Saint-Onge and Armstrong 2004):

“The customer is at the core of everything an organization does. With the current rate of accelerated change, where uncertainty and ambiguity are the only constants, the most effective way an organization can function is to be totally wired, totally connected to its customers.”

The key aspect of their model is that IBM realizes that a consumer decision is not just based on a few aspects but on “100’s” as they write in their consumer decision white paper. Within this white paper they explain that the majority of consumer decision making research has been within the qualitative research field which explores the main reason of “why” but cannot
generate the results for revenue growth. Consequently IBM has combined the best of Qualitative and Quantitative research in order to develop the Consumer Decision Process Model (Gurley, Maltsbarger et al. 2004). This model consists of Five Phases that allow a company to gain the requisite insight into the complex decision making process of the average consumer:

1. One-on-one in-depth interviews provide the crucial first understanding of how consumers work through purchase decisions.

2. The hundreds of elements from each individual consumer decision interview are converted into a process map (see Figure 3). Consumer process maps are then summarized to help organize consumer decisions into stages.

3. Individual consumer decisions are then authenticated with the use of a quantitative market survey.

4. CDP modeling develops a quantitative model to prioritize the impact of thousands of elements on the purchase decision.

5. CDP insights, along with other consumer and business strategy information, are leveraged to drive revenue opportunities.

From an academic standpoint, this model is relatively new and takes into account the complexity of the modern world that we live in today. The combination of quantitative and qualitative methodology allows organizations and researchers to accurately gauge the cognitive processes behind a purchase. The above method is not without its flaws though; the largest being that any researcher using such a method does not have access to the resources of a company like IBM hence other sources of funding would be required in order to carry out this comprehensive research program. Even with resources not being an issue, the researcher in question would need to be fairly adept in numerous areas of specialty in order to carry out this research in a thorough and concise fashion. The researcher cannot use this model but it is used within the academic paper to illustrate the fact that any consumer research in the 21st century
needs to take into account the interrelations of hundreds of factors before a clear understanding of consumer processes can be garnered.

The IBM model does do three things correct; the first being that it takes into account the numerous factors behind a decision the average consumer would make, secondly they authenticate their results in order to ensure accuracy of their research findings and lastly they prioritize the impacts of certain discoveries so that companies can take into account the most prominent factors behind a consumer process.

The researcher firmly believes that in order for both Intel and AMD to remain successful within the processor market they need to gain a comprehensive understanding of consumer purchasing decisions so that future products are created specifically for these decision processes.

After careful evaluation of the relevant literature, the only constant factor that needs to be evaluated in the context of the modern consumer focused business environment is the purchasing behavior behind a processor. The various strategic aspects in any business will always exist in an industry but in a two company competitive market, factors such as innovation, FMA etc. remain relatively constant and the only differential is the consumer due to their fallible human nature. This human nature created the different categories for consumers so that in order for success to be achieved in the GCMM, consumers need to be comprehensively understood. Therefore the relevant research question to be discussed in the next chapter is:

1. How significant a factor are consumer perceptions of the companies on the overall processor marketplace? Do these consumer perceptions influence success?
Chapter Three

Analysis of Findings and Discussion

3.1 Post Survey Analysis and Response Rates

Following the successful test implementation of the final questionnaire, it was the researcher’s decision to implement the data collection instrument on the 23rd of August 2007 and wait one week for as many responses as possible to be collected. With the survey fully implemented, the only task that remained for the researcher was to monitor responses and any potential feedback from the survey. The researcher optimistically hoped to receive as many as 1000 responses during the one week data collection process due to the sample size including almost any consumer who has bought a PC or Laptop but was not associated in any fashion to the GCMM. The first day of the data collection proceed as expected with almost 100 responses collected within the first 24 hour period however after this time elapsed, the number of responses per day was significantly lower so that at the end of the period, a total of 362 responses were collected with a respondent completion rate of 69%.

Maylor and Blackmon suggest that a response rate of 10 – 15 percent is typical for most surveys but it is the researcher’s contention here that their statistic refers to paper surveys and not the online survey method used by this researcher. The researcher then referred to the book: Mail and Internet Surveys by Dillman however despite being published in 2007, the warnings and methods described by Dillman seem antiquated as he suggests in his book that online survey creators need to be aware of the lack of internet access by a majority of the population. The population in the case of Dillman’s book refers to the United States however a recent statistic by the AC Nielsen company states that over 200 million Americans have access to the internet(Kim 2004). This press release by AC Nielsen calls into question Dillman’s criticisms and statistics however due to the lack of literature on internet surveys; the researcher has decided to use a case study in the book as a reference response rate.

The case study is entitled: A Web Survey of Computer Equipment Purchasers and mentions that 76% of those who received messages logged onto the website to respond to the questionnaire.
(Dillman, Tortora et al. 1998). Comparing the researcher’s own electronic survey to a case study conducted almost ten years ago seems fraught with issues considering the differences in technology and internet access but as stated earlier, the researcher will assume all conditions equal and therefore conclude that the response rate achieved on this survey was more than adequate therefore giving credence to the achieved results.

A 69% survey completion rate is adequate as stated above therefore that left a total of 250 completed surveys with an average completion time of 4min and 05 seconds on an 18 page survey. Despite the survey length appearing in the bottom of the survey, only one respondent complained that the survey was not a total of 18 pages which it was not. Referring to appendix 9, it can be seen that with the exception of page 1, 12 and 13 every other page only contains one question thereby limiting the possibility that a respondent could formulate answers for questions he or she has not even arrived at. With 250 completed responses they researcher received a wealth of qualitative and quantitative data which he spent approximately three days analyzing. Referring back to the Maylor and Blackmon book, the researcher organized the open answers responses into patterns according to his own judgment. These patterns were then used to create the pie charts that will be discussed further on in this chapter.

### 3.2 Geographical Breakdown of Respondents

After discussing the completion rate, the next most important statistic refers to the population distribution of the respondents. The following pie charts illustrates the geographical breakdown of the respondents which was verified by their corresponding IP addresses to ensure that the most accurate model of the respondent population was understood:
The geographical breakdown indicates that a majority of the respondents were American which was not the intended audience however the nature of the internet and the globalized online environment prevents a target geographical sample from being collected. The researcher explained in the research methodology section how the respondents would be recruited hence it will not be discussed in great detail within this section but suffice to say it is the researcher’s contention that due to the global nature of this topic, a random sample from the internet population in general will provide adequate data with all factors being equal.

The researcher must acknowledge though that a predominantly American sample does affect the consumer purchasing behavior due to the increased broadband penetration in the United Stated which has fostered a more technology savvy and aware consumer therefore the majority opinions reflected within this research would stem from those two population characteristics. Purchase awareness and technological savvy is consumer purchasing decision factors so these can be considered pertinent to the research at hand. Canada followed a close second in the
geographical breakdown with a representative sample population of 11.7%, Canada is not too different from North America therefore we can apply the above American characteristics to the average Canadian consumer.

The remainder of the geographical breakdown is not irrelevant but as stated in chapter 1 of this paper, the population sample was gathered based upon 5 distinct consumer groups as outlined by Chintagunta. With the geographical breakdown understood, the next disclaimer concerning this research must be regarding the first question:

1. Do you or anyone in your household work in any of the following sectors or companies?

A total of 17 people were eliminated immediately from the survey because someone in their household worked for AMD, Intel, the Semi-Conductor Sector or the Media Sector. This elimination was necessary by the researcher to remove the possibility of bias in the case of these potential respondents. With these respondents eliminated, the remainder of the respondent population was able to move onto page 2 of the survey.

3.3 Age and Income Distribution

Before page 2 is discussed, the remaining two questions on the 1st page of the questionnaire must be taken into account to provide a context for the responses later on in this analysis and discussion. The first contextual question would be breakdown of the ages of the respondents:

<table>
<thead>
<tr>
<th>Age Category</th>
<th>No. of Users</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 25</td>
<td>155</td>
<td>52.54%</td>
</tr>
<tr>
<td>26 - 35</td>
<td>34</td>
<td>11.53%</td>
</tr>
<tr>
<td>36 - 50</td>
<td>34</td>
<td>11.53%</td>
</tr>
<tr>
<td>Over 50</td>
<td>26</td>
<td>8.81%</td>
</tr>
<tr>
<td>Total</td>
<td>295</td>
<td></td>
</tr>
</tbody>
</table>

The above bar graph illustrates that 52.54% of the respondents fell into the 15 – 25 category that for the purpose of this research would be most likely to purchase a laptop recently for school, work or home use. The next sizable category would be the 26 – 35 year old category
who accounted for 27.12% of the population who would be people purchasing their first computers for the family or work use, they would also be not as technologically savvy as the previous age bracket being born in a generation where computers were not affordable. The remaining age category illustrates in general the decline of technology use and adoption as the respondent gets older (Horrigan and Smith 2007).

The last question to be discussed from the first page of the survey related to income distribution. This question plays an important role in the respondent analysis process because the higher the total income of the individual respondent, the more likely it is that price will not play a factor in his/her purchasing behavior:

<table>
<thead>
<tr>
<th>Income Bracket</th>
<th>No. of Users</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$35,000 - $50,000</td>
<td>52</td>
<td>17.63%</td>
</tr>
<tr>
<td>$50,000 - $75,000</td>
<td>52</td>
<td>17.63%</td>
</tr>
<tr>
<td>Over $100,000</td>
<td>52</td>
<td>17.63%</td>
</tr>
<tr>
<td>Under $20,000</td>
<td>45</td>
<td>15.25%</td>
</tr>
<tr>
<td>$20,000 - $35,000</td>
<td>42</td>
<td>14.24%</td>
</tr>
<tr>
<td>Total</td>
<td>295</td>
<td></td>
</tr>
</tbody>
</table>

The researcher must note that out of all the questions on the survey, this question was specified as non-mandatory hence some respondents could have skipped the question. The income distribution bar graph illustrates the relative equality in terms of the different income levels of the respondents answering this survey. This data further reinforces the researcher’s belief that data on all five categories of Chintagunta’s was collected to allow a comprehensive understanding of consumer purchasing behavior.

The second page of the survey only asked one question:

2. Do you research your PC or Laptop purchases before you make them?

88.3% of all respondents selected the response that they always research their purchases hence this question ties into the earlier statement that North American consumers are more likely to research their purchases due to improved internet access. This question is integral to the
research at hand because an uninformed consumer would be more likely to rely on marketing as opposed to the physical data behind a product. An informed consumer on the other hand will be more likely to make a purchase based on the product that is best suited to his/her needs hence the implication here is that product differentiation is the key in a market like the GCMM. This was proven in chapter 1 when AMD produced the Athlon™ 64 series that performed better physically than Pentium 4 Chips. In the present era, this differentiation strategy is proved by the prevalence of Core 2 Duo™ machines available at various retailers and online websites as outlined in Appendix 12.

Consumers are increasingly aware of the hardware inside their PC’s and Laptops hence it becomes essential for companies like AMD and Intel to create products that will put them ahead of the pack when it comes to consumers choosing a processor for their machine. AMD currently has the lowest priced processor but Intel has the best performing processor for the price and with the greatest selection of machines, the law of probability takes over and gives Intel the greatest change for significant profits. AMD has two possible strategies in this modern era of consumer awareness, make consumers aware of the strengths of their products through the retailers of AMD based machines or choose a segment of the processor market and cater exclusively for that segment.

These two possibilities will be discussed further on in this chapter but another important question bearing analysis is question 6:

3. From whom did you purchase your last PC or Laptop?

31.41% of respondents who answered this question selected Dell which is in line with their second quarter earnings statement which shows that their overall earnings increased by 46% from the 1st Quarter of 2007. Within the second quarter earnings statement, Dell attributes this second quarter increase to the declining price of processors thereby allowing them to create more affordable machines. HP was the second biggest manufacturer/retailer with 21.15% of all respondents selecting that their last purchase was from this company. HP also recently announced in a May 8th press release that they have lifted the guidance for their second quarter meaning they will earn greater profits in the second quarter of 2007.
Dell and HP are the two largest Laptop and Desktop manufacturers/retailers in the world and the fact that they showing increased profits due to declining processors costs indicate a disparity in the relationship between Intel and AMD. Intel achieved an overall profit in its second quarter as indicated by Appendix 12 but AMD lost money and it is the researcher’s logical conclusion that the price cutting strategy of AMD is failing. The researcher has illustrated above that due to the consumer becoming increasingly aware of the technological products that he/she purchases, companies like AMD can no longer compete on price alone. Product differentiation is the key and that is a strategy that AMD needs to explore.

It must be stated though that logically speaking it would make sense for AMD to cut prices on its processors because this would increase the chance of companies like Dell and HP offering machines with these components. Dell and HP try to offer the widest range of machines catering to the high-end, middle and lower class segments of the computer population hence AMD’s processors would make sense to implement in the lower end and some middle class machines.

Business literature would suggest that this might not be a bad idea for AMD considering its lack of size and resources compared to Intel however if we refer to Appendix 11, we can see that perhaps there is an underlying reason why there are more Intel machines offered than AMD machines. The European Commission stated in their press release (07/26/07) that Intel has been offering OEM’s like Dell and HP significant rebates for them to obtain a majority of their CPU’s from Intel. AMD cannot offer such discounts hence it falls back onto the theory spoken of in the literature review about managing Complementors. Dell and HP are not traditional Complementors but Yoffie and Kwak correctly use the term “smart power” when referring to the best way to manage Complementors.

AMD needs to find some sort of leverage (smart power) to create a benefit for both parties whereby the benefits achieved through the relationship are greater or equal to the Intel relationship. This kind of strong relationship is what AMD needs to ensure companies like Dell and HP offer as many AMD products as they do Intel’s, this equality will in turn boost sales and product exposure which is what AMD needs at this juncture in their existence. The researcher
refers back to the previous two suggestions discussed earlier in this chapter that perhaps the best strategy for AMD is to create low priced, powerful processors that are reliable so that Dell and HP can create machines for the middle to lower segment of the world’s population.

The best example here would be the burgeoning economy of the PRC; the average household income has been increasing steadily in recent years and the right kind of processor geared towards the average middle class Chinese household might be a market that could provide AMD with the resources it needs for future growth and expansion in the processor market so that in a few years it could compete with Intel on a level playing field.

The above question was conditionally based and sent respondents to different parts of the questionnaire based on their selections. 79 respondents elected the manufacturer option which in this case means companies like HP, Dell etc. Therefore they were redirected to question 7 which asked them why they bought from this particular company. This question was in an open answer format to allow for the greatest variety of responses and to give the respondent the freedom to express his/her opinions. These opinions were then categorized into generic characteristics using the personal judgment of the researcher. The data and the graph can be found in appendix 10 but the two emerging issues out of this question appeared to be price and product quality. Respondents categorically indicated that the two main reasons they buy from the major manufacturers is the price of the particular product and the quality associated with that product. These two emerging issues are further reinforced by the 19th Annual PC Magazine survey in which readers rated the desktop and laptop manufacturers on certain criteria including product quality (reliability). Within this survey, Apple and Sony achieved the highest overall score with Dell and HP only a few places behind (Metz 2006).

A distinction must be made here between product quality of the Laptop or PC and the processor itself. Processors by AMD and Intel are manufactured to the highest conceivable standards but during the transport and assembly process, some damage occur which is why sometimes when consumers purchase PC’s or Laptops, they can have a bad experience. These bad experiences can often be associated with the retailer/manufacturer/website from which they made the purchase but additionally consumers can associate a bad purchase with the
processor. This is where a close working relationship with their specific retailers can benefit AMD; they need to manage their customer experiences in such a way so that the effect of any bad PR is minimized to the utmost.

Bad PR can be the undoing of any good company but AMD can be proactive in this respect by ensuring that customer relations are a priority within the company as much as product quality is. AMD is already competing with Intel on price, if they can ensure that their low prices still deliver quality products, than they can slowly begin to achieve greater sales within the eye of the consumer.

### 3.4 Major Deciding Factors in the Last Computer Purchase?

Question 8 and 9 both asked a similar question but of those people that bought from a retailer or website, these open responses were minimal hence they will not be discussed within this paper. Question 10 is the most critical question within this research dissertation and focuses directly on the issue at hand concerning the major deciding factors behind a consumers purchase:

![Chart showing major deciding factors in the last computer purchase]

<table>
<thead>
<tr>
<th>Decision Factor</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td>139</td>
<td>32.19%</td>
</tr>
<tr>
<td>Price</td>
<td>114</td>
<td>26.39%</td>
</tr>
<tr>
<td>Processor</td>
<td>68</td>
<td>15.74%</td>
</tr>
<tr>
<td>Retailer Reputation</td>
<td>35</td>
<td>8.10%</td>
</tr>
<tr>
<td>Discount or Sale</td>
<td>35</td>
<td>8.10%</td>
</tr>
<tr>
<td>Customer Service</td>
<td>21</td>
<td>4.86%</td>
</tr>
<tr>
<td>Friend/Family/Colleague Recommendation</td>
<td>8</td>
<td>1.89%</td>
</tr>
<tr>
<td>Promotional Advertising</td>
<td>4</td>
<td>0.93%</td>
</tr>
<tr>
<td>Random Decision</td>
<td>4</td>
<td>0.93%</td>
</tr>
<tr>
<td>Was Free</td>
<td>3</td>
<td>0.66%</td>
</tr>
<tr>
<td>Catalogue</td>
<td>1</td>
<td>0.23%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>432</strong></td>
<td></td>
</tr>
</tbody>
</table>

The options for the respondent to choose were decided by the researcher according to his exploration of the main factors behind a PC or Laptop purchase. The researcher did mention in the literature review that according to the IBM CDP model, a single purchase decision can be
traced back to many deciding factors. These purchasing influences were considered to be the most prevalent by the researcher despite the perception that they may be limited; it is the researcher’s belief that they highlight the biggest deciding factors in a purchase decision for a Laptop or PC.

The data immediately reinforces the open response data in the previous question that price is a key component in the purchasing process. This may seem obvious to many people but it must be stated that price is not a major consideration in some purchases but due to the average cost of a PC or Laptop, it has become a major deciding factor. Hardware is the largest deciding factor for the respondent population that took this survey and this fact ties in with the earlier question of consumer research. Consumers are becoming increasingly aware of the internal components within their PC’s and Laptops therefore hardware is a major consideration for all consumers and not just people who would fall into the category of “technology enthusiasts”.

The processor is the third most significant category on the deciding factor scale and in part falls under the hardware umbrella. Due to the main theme of this paper revolving around the critical success factors in the GCMM, the importance of the processor allows the researcher to draw some preliminary conclusions regarding AMD’s lack of performance compared to Intel. The researcher has stated previously in this paper that AMD is currently falling behind Intel due to Intel’s current generation of consumer processors offering better performance than AMD’s. AMD’s response to this loss was to cut the prices on their PC’s which has provided limited success for the company as evidenced by their significant 2nd quarter loss therefore AMD’s single hope in this situation relies on its new generation of processors set to launch in October codenamed Barcelona.

Retailer reputation was also an important factor for the respondent pool and this can be seen in PC Magazine’s 19th Annual Reader Satisfaction Survey. Taking Dell as an example of a retailer whose reputation was the cornerstone of their earlier success, we can see how other companies have tried to emulate this model of retailer reputation. Online retailers in particular have made a concerted effort to create a reputation of providing comfortable shopping experiences and this is demonstrated in a recent research report by Blast Radius. Inc a Canadian
Consulting Firm that found Amazon.com was the number one online retailer in the United States (Ounpuu, Mitchinson et al. 2006). Regardless of the geographic context of this analysis, this proves the tangible nature of the link between retailers and the consumers that purchase the products.

These products provide sales for companies like AMD and Intel; their respective retailers and associated reputations can be a key success factor or disaster factor when it comes to consumer perceptions. The researcher has already discussed this point in great deal concerning the effect of bad PR but public relations is only part of the conundrum and perhaps a deeper relationship needs to be explored between AMD and their retailers. AMD might even go so far as to offer free training for the respective sales personnel at these retail stores so as to inform them of the products that they are selling. These strategies and more will be discussed in the final chapter of this dissertation after the analysis has concluded.

Some readers of this research might wonder about the inclusion of a separate response for “Discount or Sale” but it is the researcher’s contention that Sales/Discounts are a popular tactic amongst the world’s retailers therefore their influence should be a determining factor in the consumer context. The respondents selecting this choice should not be seen as a separate sub-sample from the original respondent pool but rather a complementary pool to indicate that Sales and Discounts still play a significant role in the purchase process of an average consumer.

The researcher has discussed price competition earlier in this research but a further elaboration is necessary when it comes to discussing the respondent’s choice of this option. Cheaper processors mean that retailers can afford to sell their PC’s and Laptops at cheaper prices therefore enabling a greater range of consumers to purchase these products. The end result being that the sales for Intel or AMD would increase but in the current market climate that would mean AMD’s sales increasing because they offer the cheapest processors.

The remaining choices of this question offer little insight but the researcher would like to point out that a popular consumer choice is not so popular in this survey, that being customer service. Customer Service has often been considered the most important factor in a consumer purchase as demonstrated by PC Magazine’s inclusion of the factor in their reader satisfaction
survey. Customer Service will never cease to be an important issue but in the modern era where companies like Dell, HP etc. are learning that a defective or difficult product can be costly; the need for customer service has decreased because the average consumer has become more technology aware therefore only purchasing quality products with the least likely chance of malfunctioning.

The answers to question 10 directed the respondents to various categories, these categories than further examined the issue of consumer influences in the purchase process before ending with the last question asking for further comments on the Intel/AMD Debate. Hardware was the most important deciding factor as illustrated by question 10 therefore respondents choosing that choice were finally lead to a question in an open answer format asking them why hardware matters (Appendix 10). The researcher mentioned earlier in this paper the method used to analyze these open answers therefore with that being said, there were four emerging issues as far hardware was concerned. The respondents who answered this question categorically indicated that performance, personal choice, price and gaming where the reason why hardware became a major issue for their purchase.

The researcher has mentioned this before but this goes back to the point of consumer awareness, in that consumers are increasingly aware that different hardware affects the performance of their machines. The average consumer understands that processor speed is not always the answer and that the more RAM you have within your machine, the better it will run. Price was also a major issue but that issue has already been discussed earlier therefore that leaves gaming for analysis. Gaming has grown over the years so much so that it has become a segment for companies like AMD and Intel to target hence one of the popular ways of determining the strength of a processor is putting through a slew of gaming benchmarks. A recent NPD Group press release also indicated that heavy gamers spend as much money on gaming associated products as 8 other regular people and this is a significant fact for companies like AMD and Intel(Riley 2007). Gaming sales are only expected to increase and this is where AMD’s recent acquisition of ATI can prove to be beneficial in the future if used correctly. The most common problem in any form of gaming whether it be Console or PC is that the
cooperation between the processor and the graphics card can be problematic. AMD was noted earlier in this century for creating the first integrated memory controller but if they can create the first CPU that integrates graphics on a single die than this might help give them an edge in this section of the hardware market.

3.5 Price as a Purchase Influence

With the hardware analysis concluded, the only other significant question beyond the last question that achieved a noteworthy number of responses is question 20:

Many of the respondents skipped this question but for those that answered we can see that the preferred range for laptop purchases is in the $600 - $1500 range. This information is congruent with the average consumer’s ideal price range of laptops. The price range above $1500 is usually concerned with those consumers wishing to purchase gaming or desktop replacement laptops. The respective price range for PC’s is average as well with any price above that amount exceeding the needs of the average consumer. Price has been discussed thoroughly in the preceding text but another aspect of price is that retailers need to adopt the best product mix in order to retain strong revenue growth (D’Onofrio 2006). This means that retailers like Dell, HP, and Lenovo etc. need to create a wide variety of products in order to appeal to the widest range of customers. Not all customers have the same needs and creating the right product mix will maximize retailer income while ensuring that consumers have the products they need with the processors that they need. Going back to AMD’s low price
strategy, this might be a key element for the company here to create processors with performance and price in mind that delivered quality and reliability to the greatest range of consumers. Intel’s chips win on performance for the most part but the benchmarks in the appendices prove that these margins would not be noticed by the average consumer despite their technological savvy.

AMD might explore this fact and promote low-cost high performance devices to the mass market in a price range so that retailers could take the product the rest of the way in the eyes of the consumer. Once the retailer makes the final marketing pitch to the consumer, and if this pitch is successful, AMD might find that a low pricing strategy is efficient and effective in creating products that meet the majority of consumers needs.

3.6 AMD/Intel Open Answer Discussion

The last question of this research dissertation was a combination of a common survey principle while hoping to encompass any opinions that the respondent had concerning these two companies. The respondent was given the maximum leeway in order for him/her to write down responses in any form without restricting the answer to a specific question. This tactic for the most part elicited a significant number of responses that allowed the researcher to discover further details about the performance gap between AMD and Intel.

The respective data was pattern analyzed and mapped as spoken of earlier in this chapter and the raw data can be found in Appendix 10. The most significant issue was that respondents mentioned that their chief concern when it came to these two companies was that they would buy whomever’s component was better. This is a simple statement allows the researcher to draw many conclusions in that often advertisements of performance are not very specific. Some companies like Dell whose flyer can be seen in the appendices do not offer the average consumer any hint as to whose processor is better but merely highlight the price differences. Other companies like PCWorld™ here in Ireland and the U.K often show emphasize that the Intel Core 2 Duo™ is the best performing processor as demonstrated by their advertisements during the August and July months. This discovery highlights again the link between the retailer
and the manufacturer of the product in that a processor’s success might be determined by the advertising or promotional mechanisms a retailer employs to draw consumers into the store or website.

These observations are obviously speculation and will be concluded in the final chapter of this dissertation but the researcher must mention that with any statistical study, the greater the number of respondents, the less margin of error. The second most important issue emerging from the final question was the consumers mentioned that Intel is better than AMD at the moment. This statement reinforces the earlier notion that consumers are much more aware of the products that they purchase however sometimes this awareness is not taken into the context of their daily PC/Laptop tasks.

The previous two statements highlight two important factors of the consumer decision making process in the GCMM. Consumers are increasingly aware of the products that they purchase to a certain extent and but they also recognize that competition is an essential aspect of any market. The competition aspect was the third most significant discovery in the last question and ties into the legal aspect of this market as mentioned in Appendix 11. Consumers all around the world realize that a monopoly is not good for prices and some respondents even suggested that they purchase AMD to help support the company since it is experiencing such difficult times. These sympathy responses were very few but still help to shed an interesting light on the back and forth competition between AMD and Intel.

Lastly the researcher would like to make reference to the Facebook polls in Appendix 7, these polls indicated that consumers did not care what kind of processor was inside their PC. The responses collected during the complete survey contradict these results but the researcher must caution here that polls are singular instruments and allow for no exploration of issues hence the Facebook results were only used as guiding tools for constructing the complete questionnaire found in Appendix 9.

The preceding analysis in this chapter reveals numerous facets concerning the global consumer microprocessor market and the various factors that intersect in its daily activities therefore the
researcher will endeavor to tie all of these previous discussions together to form a definitive conclusion in the following chapter.

Chapter Four

Conclusions and Recommendations

4.1 Key Success factors in the Global Consumer Microprocessor Market

The preceding chapters have methodically approached the issue of the critical success factors behind the global consumer microprocessor market. The researcher has adhered to a rough structure in the hopes of illuminating the key success factors in this industry while retaining a comparative approach of AMD and Intel the only two companies in the consumer processor market. It was not the researcher’s intention to use a comparative approach but during the research process, the comparative approach proved to be the best method in order to discover what the critical success factors in this industry are.

The preceding chapters and analysis yielded the following key success factors within the global consumer microprocessor market:

1. Product innovation and differentiation
2. Acknowledgement of consumer technical awareness
3. Product price

In the introduction chapter, the researcher gave a brief historical context to the current situation we find ourselves in. In this situation we see that there has been a constant battle between AMD and Intel in order to capture the minds of the consumer. This battle has often fallen down to sheer product innovation and differentiation however it was the researchers aim to discover whether there was a further underlying strategic business issue in this conflict. The researcher believes that in the scope of his research, he has unearthed some valid strategic management and competitive advantage issues which could be explored at a later date by some future investigator. The next significant discovery during the course of this research was
that consumers all around the globe are becoming increasingly aware of even the most technological products.

This product awareness was demonstrated in the survey data by the respondents who categorically indicated that hardware was their chief concern when deciding what Laptop or PC to purchase. This discovery was contrary to the researcher’s belief in that he expected “technology enthusiasts” to be the people most concerned with hardware but the majority of the respondent population indicated that hardware was their main concern that reinforces the earlier assertions in this paper concerning the product awareness by consumers.

The internet is proving to be a medium for consumers by which they can accurately research the pros and cons of a product. Companies like AMD and Intel have taken that into consideration by ensuring that the products they create are technically superior to their competitors. If such superiority cannot be achieved, then companies need to adopt another strategy such as price cuts as demonstrated by AMD once they realized that the Core 2 Duo™ was the preferred processor in consumer laptops and PC’s. This price cutting strategy has provided AMD with limited success by increasing the purchases of products with their processors but not addressing the main issue which is how to compete effectively with a company like Intel.

An issue which ties into consumer awareness but did not appear in the research is the influence of advertising on the consumer decision making process. The respondents in this research indicated that they were not influenced by the Intel media campaigns and various slogans that exist in society today. Respondents also indicated that they were not affected by AMD’s media campaigns and that is because AMD does not take such a proactive approach to marketing its products to the general public. The promotional advertising aspect of this research was an interesting discovery because in the initial considerations of this topic, it was the researcher’s primary belief that if AMD wanted to improve their standing in the market, they would need to engage in a broader public awareness campaign of their products.

This belief by the researcher was reinforced by casual conversations with people in the researcher’s educational institution and close friends who did not have an accurate picture of
what kind of company AMD was. The data however revealed a totally different picture by indicating that virtually no respondents were affected by promotional advertising in their various product purchases. This discovery by the researcher is debatable because marketing and advertising literature still insist the need for targeted marketing campaigns to make consumers aware that there are products out there that cater for their needs (Ferris 2007).

The researcher would therefore like to contend that this issue would need further exploration and might be an idea for future research focusing on specifically on the influence of promotional advertising on consumer purchasing behavior. Due to the scope of this research, advertising was one of the many issues that need to be considered but would definitely qualify for its own individual research paper. The last significant issue to appear within the scope of this research was that price was a major influence on the purchasing behavior of consumers.

The researcher stated previously that price was an obvious issue by at what price levels are consumers influenced in their purchasing process. The $600 to $1000 level was indicated by the respondents to be the most ideal price range for them to purchase laptops and PC’s. When we look at retailers like Dell, HP, Lenovo etc. we can see that this price range holds true for the vast majority of products offered by these companies. Browsing their websites we can see that there are far fewer expensive products which is logical considering that in any economy, the rich are few while the average/poor consumer forms the majority of any market.

The issue of price does not stop at the sheer purchasing level because this survey was used to determine what influences the purchases of the average consumer therefore companies like AMD and Intel can utilize this data in order to maintain their respective success’ in the marketplace. The current market situation reveals that AMD’s processors are cheaper than Intel’s by almost $100 therefore as stated earlier by the researcher this price cutting strategy has provided the company with limited success. Intel on the other hand has cut prices to an extent but not to the level where they are incurring significant losses due to the price cut.

It is the researcher’s contention that price cutting was an ineffective strategy for AMD in the current market place and with the company’s current resources for three reasons:
1. AMD has just made a significant purchase of ATI which decreased it cash reserves and put the company in a precarious financial position.

2. Price cutting is only effective if it is the desire of the company to maintain a low priced strategy to compete with Intel.

3. AMD should have had significant production capacity in order to ensure that the price cuts did not affect the bottom line of the company.

AMD’s purchase of ATI was a strong strategic move for the company who is noted for innovation however this purchase came at a time when the Core 2 Duo™ was just released. The release of the Core 2 Duo™ signified the end of AMD’s reign in the consumer market and this affect sales as well as the bottom line of the company at a time when it had just spent a huge amount of money. One of the respondents also suggested in the survey that AMD would be doomed to occupy the low priced processor segment of the consumer market.

This occupation might seem to be a bad idea for AMD enthusiasts however as Michael Porter suggests that a company can only outperform its rivals if it can create a sustainable competitive advantage (Porter 1996) therefore this must be the key for AMD. The constant battle between AMD and Intel cannot be sustainable in the case of AMD due to their drastically different sizes and financial resources. It is the researcher’s researched opinion after reading the relevant business literature and evaluating consumer opinions that the best strategy for the company is to create a sustainable competitive advantage which it does not have at this moment.

Academics and Technologists might argue this point however the study of history provides us clues to the future and in this future AMD will expend all of its resources and key intellectual capital if it does not choose a definitive strategy or receive an injection of capital. This capital might come in the form of a fine imposed due to legal action against Intel but such cases are often drawn out and highly speculative therefore focusing on the near to long term prospects of AMD the company must decide where to compete.

Taking all the information discovered in this research, the researcher has recommended that AMD should focus on creating low cost but effective processors. They should not concern themselves with creating processors that are better than Intel’s but merely processors that can
allow the retailers to offer Laptop’s and PC’s at a cheaper price than Intel can. This strategy is obviously not a short term solution but it is the researchers believe that it will allow AMD to achieve a product focus that it has been lacking over a number of years and a focus that could allow it to achieve a modicum of constant success and perhaps create a platform for the company to expand into the entire market in the future.

The last key issue to consider with regards to the price cuts is the fact that AMD does not operate as many fabrication facilities as Intel does (SIA 2007). This fact is pivotal because AMD’s current strategy demonstrates that it is trying to keep up with Intel on a global scale when it does not even have half of the fabrication capacity. This lack of fabrication capacity results in a lack of economies of scale and the eventual effect on the AMD bottom line. Referring back to Appendix 12, we can see the final effect of AMD’s most recent strategy on the financials.

4.2 Recommendations for AMD

Taking the preceding analysis and discussion into account, the researcher has come up with the following strategies for AMD to regain its hold on the consumer processor market:

1. AMD needs to decide on its place within the market, what it wants to achieve and where it sees itself in the future.

2. The company needs to reorganize itself around a focused unified strategy so that it can create a secure foothold in the consumer processor market. Intel already had this foothold by virtue of its early discovery of the first computer chip and earlier start than AMD. Once AMD has achieved a strong revenue base, it can then pursue other expansion strategies for further development of the company.

3. Henri – Richard who is the executive vice president and Chief Sales and Marketing Officer at AMD recently stated that he does not see AMD directly competing with Intel (Younis 2007). This interview is symptomatic of a lack of direction for the company since product and market trends as well as the media both prove that they are in direct competition with Intel. Further on in the interview he states that he believes that AMD and Intel can both survive in the market but it is the researchers’ belief that this statement can only be true if AMD adopts a focused strategy.

4. Retailer cooperation and cohesions is another essential component, this is where AMD has done well with recent years showing how many of the world’s retailers
have started to offers Laptop’s and PC’s with AMD processors. This is the first step however and AMD needs to pay close attention to their retail partners so that advertising and product awareness are as equal as Intel.

5. Consumers are the largest market in the world; AMD needs to promote its products through clever advertising as opposed to showcasing their superior products. The researcher stated earlier that consumers are increasingly aware of whose products are better therefore AMD should respect the consumer for their savvy but appeal to the rest of the world’s consumers by demonstrating their products can do the same work as Intel's for a significant reduction in cost.

A unified strategy combined with better retailer cooperation while promoting their products to the mass market would be the best step for AMD to take in its war for market share with Intel. These three key aspects are by no means the solution to the company’s problems but all things considered they are the researcher’s critical success factors in the global consumer microprocessor market.

4.3 Recommendations for Future Research

Reflecting back on the final research question and methodology used for this research, the researcher believes that the question of consumer perceptions and influence has been answered concisely considering the time and data collection constraints that existed. This research paper illustrated the influences that the majority of the respondent sample felt affected their purchase decisions. This sample ideally should have consisted of Chintagunta’s five categories of consumers however enforcing such a constraint would be impossible on the internet due to the anonymity of the respondents and lack of personal communication with the researcher and the potential respondents. If another researcher felt like conducting similar research and a survey instrument was available in the future that could ensure a representative sample from the overall population that might be an idea for future research.

Another integral part of this research was the discovery of the IBM CDP model during the researchers search for relevant consumer decision making literature. The model itself is quite complex and as stated earlier in this paper; it would be irrelevant for the researcher to adopt such a complicated approach in order to understand consumer purchasing behavior in this
context. Modern marketing literature is still unsure about the various metrics for consumers and whether they can be considered reliable yet a recent article in Advertising Age accurately illustrates that many consumers still act irrationally when it comes to certain products (Bloom 2007).

The IBM CDP model is very accurate and goes through a multi stage process of affirming the factors behind a consumers purchase process. That being said the researcher would like to make the following recommendations for future research

1. A larger sample would always be better but as suggested above, perhaps conduct this survey with controlled groups and utilize focus groups in order to reinforce conclusions drawn from the survey data.

2. A Computer Science major might want to discuss the hardware aspect of this dissertation comparing the physical chip characteristics of AMD's and Intel's processors to determine the success factors for optimal processor design.

3. The researcher did not factor in the retail aspect of this dissertation therefore any research undertaken in the future should examine the processor – retailer – consumer link in greater detail to determine the role that retailers play in significant detail in the GCMM.

The researcher believes that the goals of this research were met allowing future researchers and students to understand the global consumer processor market and the associated critical success factors in a context that is so often forgotten in the modern day media. These success factors helped in the understanding of what drives the two major competitors in the market and the strategies AMD needs to consider in order to remain competitive in the years to come.
Chapter Five

References


Appendices
Appendix 1

Processor Benchmarks

Athlon 64 vs. Pentium 4 (Tomshardware.co.uk)

<table>
<thead>
<tr>
<th>Processor</th>
<th>Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlon 64 3800+</td>
<td>311</td>
</tr>
<tr>
<td>Pentium 4 3.20</td>
<td>321</td>
</tr>
</tbody>
</table>

Multitasking II
Winrar 3.60 + Photoshop CS 2 (all apps running at the same time)

*These Charts are measuring processing time to complete the specified tasks and are measured in seconds using the criteria set out in Multitasking II

Athlon 64 X2 vs. Pentium D (Tomshardware.co.uk)

<table>
<thead>
<tr>
<th>Processor</th>
<th>Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlon 64 X2 4800+</td>
<td>199</td>
</tr>
<tr>
<td>Pentium D 930</td>
<td>208</td>
</tr>
</tbody>
</table>

Power Consumption: Core 2 Duo (Hardocp.com)

![Idle Testing with Speedstep and Cool n Quiet](chart.png)

Idle Power Consumption
Intel Speedstep and AMD Cool n' Quiet Enabled

- Intel Core 2 Extreme X6800: 172
- Intel Core 2 Duo E6700: 171
- AMD Athlon 64 FX: 137
- AMD Athlon 64 3800+: 133

Wattage - Lower is Better
Appendix 2

CPU Charts (Tomshardware: July 16, 2007)

The following charts are used in order to illustrate two tasks that the average consumer might find essential in their daily activities:

1. Chart 1 measures the processor usage playing back 60 seconds of the Blu-Ray DVD Casino Royale with PowerDVD 7.3

An explanation for Blu-ray can be found in Appendix 13 but when looking at this data we can see that the CPU generations like the Athlon 64™ series and the Pentium D™ struggle to play this high definition medium. This hardware chart is considered by the researcher to be quite valid since despite the hardware format war between Blu-ray and HD-DVD, both these mediums are here to stay and will become increasingly part of the consumer household as the costs of these units and discs drop accordingly. The media centre is also a popular addition to the modern day household and these centres contain the processors that are spoken of in this dissertation hence this chart can help provide insight into how little difference processor usage will affect the average consumer.

2. Chart 2 measures the time it takes the PC or Laptop to scan 8.5 gigs of data which we can basically classify as the size of a typical windows XP folder.

Chart 2 is interesting because it uses AVG Antivirus which is not what the researcher considers as a mainstream Antivirus package. A mainstream package will be a security suite from companies like Symantec or MacAfee whose products most people consider to be premium Antivirus packages. AVG is considered to be a decent piece of Antivirus software though and quite efficient hence the short processor times when looking at Chart 2. The less time the better and again the researcher would like to point out that the average consumer would not be able to quibble about a few seconds when it comes to tasks such as the monthly virus scan.
Appendix 3

Definition of the Average Consumer

The average consumer is a term employed within this academic paper and during the literature it came to the researcher’s attention after extensive research in the library, books, and the internet that no real definition exists. The researcher came across two promising definitions, one economic and one legal. The legal paper (Incardona 2005) uses a definition by the European Court of Justice that states:

“The typical consumer is one who is reasonably well informed and reasonably observant and circumspect, and who has exercised due care and attention in making a transactional decision”.

The above legal definition is a good starting point in order to fully understand the term however another perspective needs to be considered. Therefore the following extract from a paper written by Ed Hopkins from the Journal of Economic Literature (Hopkins 2006) will be the researchers base from which to extrapolate a definition:

“It remains possible for an individual to have a series of realizations that would take her beliefs far from the correct level. However, if the population is large, then the law of large numbers would ensure that a large proportion of the population at any time would have beliefs close to being correct (there are no aggregate shocks in this model only individual). Beliefs for most of the population will also be close to the average belief, and so the average consumer will be a good approximation for the population distribution.”

From the above extracts we can conclude that the average consumer is a person whose beliefs in a certain area/subject or theme coincide with those of his or her general population. With reference to the academic paper at hand, it refers to the usage by an average consumer of email, internet surfing, shopping, social networking and online video.

References:


Appendix 4

Illustrative CDP Model

Source: IBM Institute for Business Value.
Appendix 5

Dell September 2007 Flyer (Ireland)

Side 1: On the first page of this flyer, we can see that one Intel symbol and one AMD symbol is visible on the associated products. This would seem to be a fair representation considering Dell sells both Intel and AMD products.
Side 2: The truth behind the advertising comes out once we turn to the inside of the flyer and see that there are no more Intel symbols as we can see 3 AMD symbols as visible in Side 2. The researcher finds this highly curious and speculates that perhaps some of AMD’s marketing budget has been spent on ensuring that their symbols receive premium consumer eye contact compared to Intel’s symbols.
## Appendix 6

Maylor and Blackmon Research Diagram

<table>
<thead>
<tr>
<th>Table 5.4 Summary of the scientific and ethnographic approaches (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristic</strong></td>
</tr>
<tr>
<td>Research philosophy</td>
</tr>
<tr>
<td>Research perspective</td>
</tr>
<tr>
<td>Archetype</td>
</tr>
<tr>
<td>Questions that can be answered</td>
</tr>
<tr>
<td>Starting point</td>
</tr>
<tr>
<td>World-view</td>
</tr>
<tr>
<td>Objective</td>
</tr>
<tr>
<td>Underlying logic</td>
</tr>
<tr>
<td>Who uses?</td>
</tr>
<tr>
<td>Role of theory</td>
</tr>
<tr>
<td>Process</td>
</tr>
<tr>
<td>Associated methods</td>
</tr>
<tr>
<td>Data type</td>
</tr>
<tr>
<td>Finding</td>
</tr>
</tbody>
</table>
Appendix 7

Facebook Polls

Would you buy an AMD PC if you knew more about them?

- Yes, but it has to be lot more (5%) - 5
- Yes, if they advertised more (65%) - 6
- Not really sure, Don't really care (51%) - 51
- I already buy AMD only (28%) - 28
- AMD Sucks, Intel Forever! (10%) - 10

Recent Responses

- Not really sure, Don't really care
- Yes, but it has to be lot more
- I already buy AMD only
- AMD Sucks, Intel Forever!
- Not really sure, Don't really care

Information

- Poll Status: Completed
- Audience: All Users
- Poll Start Time: Jul 10, 2007 10:18am
- Responses: 100
- Max Responses: 100
- Cost Per Response: $0.10
- Final Cost: $11.00
- Export Data: tab-delimited

Demographics and Insights

Responses by Sex

- female
  - 0: 36
  - 13: 63

- male
  - 0: 15
  - 13: 25

Responses by Age

- 13-17
  - 13: 19
  - 17: 53

- 18-24
  - 18: 24

- 25-34
  - 25: 24

- 35-49
  - 35: 4
Does the CPU inside a computer influence your purchase?

- Don't own a computer (3%) - 3
- Don't really care (39%) - 77
- What's a processor (14%) - 27
- Yes, AMD Forever (17%) - 34
- Yes, Intel Only (23%) - 57

Recent Responses
- Don't really care
- Yes, AMD Forever
- What's a processor
- Yes, Intel Only
- Don't really care

Information
- Poll Status: Completed
- Audience: All Users
- Poll Start Time: Jul 09, 2007 9:00pm
- Responses: 200
- Max Responses: 200
- Cost Per Response: $0.10
- Final Cost: $21.00
- Export Data: tab-delimited

Demographics and Insights

Responses by Sex
- Female: 83
- Male: 117

Responses by Age
- 13-17: 53
- 18-24: 30
- 25-34: 109
- 35-49: 6
## Appendix 8

**Neowin Polls ([www.neowin.net](http://www.neowin.net))**

* The researcher would like to state that the 2007 Neowin Poll was not included in this dissertation because the data for this year’s Poll is not available until 2008. Furthermore from 2006, the site operators of Neowin.net have decided to include ATI/Nvidia in their yearly polls because these two companies are in a similar situation to AMD and Intel but in the Graphics Card business as opposed to the semi-conductor industry.

### The Great Intel/AMD & ATI/nVidia Poll of 2006ish, Which way do you lean?

<table>
<thead>
<tr>
<th>Processors</th>
<th>Votes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel processor</td>
<td>409</td>
<td>35.81%</td>
</tr>
<tr>
<td>AMD processor</td>
<td>733</td>
<td>64.19%</td>
</tr>
</tbody>
</table>

**Total Votes: 1318**

### The Great Intel or AMD Poll of 2005ish

<table>
<thead>
<tr>
<th>Video Cards</th>
<th>Votes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATI</td>
<td>3088</td>
<td>34.12%</td>
</tr>
<tr>
<td>Nvidia</td>
<td>749</td>
<td>65.88%</td>
</tr>
</tbody>
</table>

**Total Votes: 1800**
Appendix 9
Original Survey Questionnaire

1. The First Page
   a. Do you or anyone in your household work in any of the following sectors or companies?
      i. None of the above
      ii. Intel
      iii. Semi-conductor Industry
      iv. AMD
      v. Press/Media
   b. What age category best describes you?
      i. 15 – 25
      ii. 26 – 35
      iii. 36 – 50
      iv. Over 50
   c. What country do you currently reside in?
   d. What income bracket best describes your household?
      i. Under $20,000
      ii. $20,000 - $35,000
      iii. $35,000 - $50,000
      iv. $50,000 - $75,000
      v. $75,000 - $100,000
      vi. $100,000+

2. Research Page 1
   a. Do you research your PC or Laptop purchases before you make them?
      i. Yes, Always
      ii. Yes, Sometimes
      iii. No, never need to do research
      iv. I don’t know where to do the research
      v. No, prefer to ask the store clerk
      vi. Other

3. The Option Page 1
   a. From whom did you purchase your last PC or Laptop?
      i. Dell
      ii. HP
      iii. I have never purchased a laptop or PC in my life
      iv. Best Buy
      v. Lenovo
      vi. Komplett.ie
      vii. EBay
viii. Toshiba  
ix. Circuit City 
x. PCWorld 
xii. Amazon 
xii. Argos 
xiii. Buy.com 
xiv. Other 

4. Manufacturer Page  
a. Please describe in as much detail as possible the main reason why you chose to buy from this manufacturer?

5. Retail Page  
a. Please describe in as much detail as possible the main reason why you chose to buy from this Retailer?

6. Website Page  
a. Please describe in as much detail as possible the main reason why you chose to buy from this website?

7. The Option Page 2  
a. What were the major deciding factors in your last computer purchase?  
   i. Hardware  
   ii. Price  
   iii. Processor  
   iv. Retailer Reputation  
   v. Discount or Sale  
   vi. Customer Service  
   vii. Friend/Family/Colleague Recommendation  
   viii. Promotional Advertising  
   ix. Random Decision  
   x. Was Free  
   xi. Catalogue

8. The Hardware Page  
a. Do the hardware specifications affect your choice of PC or Laptop?  
   i. Yes, definitely  
   ii. Yes, sometimes  
   iii. No, hardware specifications are irrelevant  
   iv. No, I do not care what is inside my PC  
   v. Not really sure

9. Hardware Page 2  
a. Why do hardware specifications matter?
10. Processor Page
   a. Do you know what kind of processor is inside your PC or Laptop?
      i. Intel
      ii. AMD
      iii. Cyrix
      iv. Don’t really care
      v. Not really sure
      vi. Other

11. Processor Page 2
   a. Would a better knowledge of processors and comparable data affect your purchase?
      i. Yes, it would
      ii. No, I do not care about the internal hardware
      iii. No, such information is too technical for me
      iv. Not sure
      v. Yes, as long as the data was easy to understand

12. Intel Advertising
   a. Do the various Intel media campaigns affect your purchase?
      i. No, These adverts played no role in my purchase decision
      ii. No, These adverts are entertaining but that is the limit of their effect
      iii. Yes, These adverts play a role in my decision to purchase Intel products
      iv. Not really sure
      v. Yes, these adverts are the main reason for my purchase
      vi. Other
   b. Why do you buy Intel Products?
      i. Product Research
      ii. Recommendation
      iii. Intel makes better products
      iv. More reliable
      v. Better price
      vi. Other

13. AMD Advertising
   a. Do the various AMD media campaigns affect your purchase?
      i. No, What AMD adverts?
      ii. No, These adverts were just entertaining
      iii. Yes, These adverts played a partial role in my decision to choose AMD
      iv. Not really sure
      v. Yes, These adverts played a major role in my decision to choose AMD
b. Why do you buy AMD Products?
   i. Better Price
   ii. More reliable
   iii. The processor does not matter
   iv. I prefer to support the “under-dog”
   v. AMD products are more customer focused
   vi. Other

14. AMD Hook Page
   a. You would buy AMD over Intel if you knew?
      i. Some of AMD’s processors are technically better than Intel’s
      ii. AMD products are as reliable as Intel’s
      iii. AMD’s processor are more energy efficient
      iv. AMD’s processors are cheaper
      v. More about the company
      vi. Other

15. Price Page
   a. You mentioned that price was a big factor in your PC/Laptop purchase decision:
      i. $0 - $300
      ii. $300 - $600
      iii. $600 - $1000
      iv. $1000 - $1500
      v. $1500

16. Advertising Page
   a. You mentioned that advertising was the main factor in your PC/Laptop purchase decision:
      i. The adverts by Intel make me feel that they are more reliable
      ii. The adverts make me aware of the choices that I have
      iii. The adverts are cleverly done
      iv. The adverts are entertaining and make me want to research Intel or AMD products
      v. The adverts by Dell/HP/Toshiba/Bestbuy/CircuitCity always offer good deals
      vi. Other

17. Reputation Page
   a. You mentioned that retailer reputation was a factor in your purchase decision:
      i. My chosen retailer has always sold me quality products that have never given me trouble
ii. My retailer has excellent customer service and in the staff are very helpful
iii. My retailer is nationally known as fair and honest
iv. My retailer always offers well known brands and decent prices
v. My retailer is the most convenient to my current location
vi. Other

18. The Final Page
    a. Do you have any final thoughts regarding the AMD/Intel Debate?

* The researcher would like to stipulate here that all the text highlighted in red are the options for the various questions in the complete survey. The skip logic statements were not included because it was felt that they would not hold substantive value in the appendices.
Appendix 10

Post Survey Data Analysis

Final Question Analysis: Do you have any final thoughts regarding the AMD/Intel Debate?

* The final question was the most comprehensively answered in the survey as numerous respondents chose to give their opinion regarding the AMD/Intel debate. Some data was quite valid but like with any research, a portion of the responses were invalid due to their frivolous nature.
Question 9: Why do hardware specifications matter?

* The hardware question was another significant discovery in the data analysis process as many of the respondents choose to answer this question and gave valuable qualitative data that demonstrates that Personal Choice, Performance and Gaming are significant factors when it comes to people choosing computers and why hardware is a factor in their decision.
Question 7: What were the major deciding factors in your last computer purchase?

*A screenshot was taken for the purpose of the appendices in order to illustrate the pattern analysis process that was used in order to identify trends within the data. The pattern analysis was based on the researcher’s own judgment as stipulated in the main portion of the thesis.
Appendix 11
Pending Litigation: AMD vs. Intel

It is the researchers believe that though the pending litigation between AMD and Intel holds no bearing on the main hypothesis behind this dissertation, it is still a topic that bears discussion in the context of the GCMM. The slim prospects of AMD actually winning a lawsuit against Intel recently improved due to the European Commission recently filing a statement of objections against Intel. This statement detailed the various grievances by AMD as well as the EC and involved a lengthy discovery process by the EC including raids on Intel offices in 2005. AMD has moved with the momentum of this finding and setup its own website entitled “Break free-AMD” which highlights AMD’s struggle for fair competition. AMD’s legal counsel recently hired a consultant whose research proves that Intel has garnered significant profits through its years as the majority processor maker in the world(Williams 2007). All of these facts and figures have polarized the antitrust case filed by AMD against Intel and divided consumers and organizations along support lines for either company.

These figures are disputed by many consumers and the media from the two perspectives of this issue, those organizations or people who are pro-Intel firmly believe that the figures and facts have been manipulated in order to prove AMD’s case. Pro-AMD organizations and people have insisted that there is a lot more to discover and particularly point to the three points raised in the EC commission multi-year investigation(Somers 2007):

- Intel has provided substantial rebates to various OEMs conditional on them obtaining all or the great majority of their CPU requirements from Intel.
- In a number of instances, Intel made payments in order to induce an OEM to either delay or cancel the launch of a product line incorporating an AMD based CPU.
- In the context of bids against AMD-based products for strategic customers in the server segment of the market, Intel has offered CPUs on average below cost.

AMD has gained a lot of momentum in their effort to fight for fair competition however there are a number of mitigating factors within this lawsuit. Intel has shown increasing profits within the last two quarters of 2007 not to mention increased public support for their practices and products. This means that the traditional base of AMD’s support has been eroded and that the public support that AMD once had does not exist anymore.

This lack of a strong customer base and public opinion weakens AMD’s case because Intel priced PC’s are for the most part on an equal footing with AMD’s PC’s. Where AMD does have a case can be seen in Appendix 13 when comparing the number of AMD and Intel Laptops at a company like Dell. Intel clearly has more PC configurations and Laptop configurations which definitely skews the market in their favor from a logical standpoint.
The question that than comes to mind is whether this market differential defies fair competition laws, The European Union has proven itself to be very pro-consumer in many years but that may be due to the lack of the willingness of the judicial system in the U.S to interfere with Corporate matters.

Intel clearly has a problem here, if they lose the court case, they could be forced to pay a fine amounting to the Billions of dollars. This might affect Intel’s operations but then again it might also level the playing field when it comes to the consumer processor market. The case is set for 2009 and this will truly decide the future of the consumer processor market, a loss for AMD would worsen AMD’s financial situation so perhaps the best hope for the rest of the world would be for a win and a fine imposed on Intel to level the playing field.

References:

## Appendix 12

### Comparative Spreadsheet: Intel vs. AMD

#### Reference AMD Intel

<table>
<thead>
<tr>
<th>Reference</th>
<th>AMD</th>
<th>Intel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue (2nd Quarter 2007)($US)</td>
<td>$1,378,000,000</td>
<td>$8,680,000,000</td>
</tr>
<tr>
<td>Total Operating Expenses</td>
<td>$917,000,000</td>
<td>$2,725,000,000</td>
</tr>
<tr>
<td>Net Income</td>
<td>-$600,000,000</td>
<td>$1,278,000,000</td>
</tr>
<tr>
<td>Change in Cash and Cash Equivalents</td>
<td>$1,594,000,000</td>
<td>$4,709,000,000</td>
</tr>
<tr>
<td>Total Assets</td>
<td>$13,224,000,000</td>
<td>$50,294,000,000</td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>-$8,752,000,000</td>
<td>-$10,596,000,000</td>
</tr>
<tr>
<td>Marketing, General and Admin. Expenses</td>
<td>$365,000,000</td>
<td>$6,096,000,000</td>
</tr>
<tr>
<td>Current Market Share (Q1 2007)</td>
<td>18.70%</td>
<td>80.50%</td>
</tr>
<tr>
<td>Current Market Share (Q2 2007)</td>
<td>22.90%</td>
<td>76.30%</td>
</tr>
<tr>
<td>Foundation Year</td>
<td>1969</td>
<td>1968</td>
</tr>
<tr>
<td>Full Time Employees</td>
<td>16500</td>
<td>94100</td>
</tr>
<tr>
<td>Highest Priced Consumer Processor</td>
<td>64 FX-62 ($399)</td>
<td>Core 2 QX6850 ($1499)</td>
</tr>
<tr>
<td>Lowest Priced Consumer Processor</td>
<td>Sempron ($29.99)</td>
<td>Celeron D315($37.99)</td>
</tr>
<tr>
<td>Number of Dealers (U.K)</td>
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<td>37</td>
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<tr>
<td>Number of Dealers (USA)</td>
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<td>Number of PC Configs. Dell (IRE)</td>
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<td>Number of PC Configs. Dell (USA)</td>
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</tr>
<tr>
<td>Number of Laptop Configs. Wal-Mart (USA)</td>
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<tr>
<td>Number of PC Configs. Wal-Mart(USA)</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td>Number of fabrication facilities</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Latest Consumer Processor Technology</td>
<td>Quad Core</td>
<td>Quad Core</td>
</tr>
<tr>
<td>Current Ratio</td>
<td>1.453</td>
<td>3.04</td>
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<tr>
<td>Debt/Equity Ratio</td>
<td>1.238</td>
<td>0.052</td>
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<tr>
<td>Stock Beta</td>
<td>3.35</td>
<td>1.62</td>
</tr>
<tr>
<td>Return on Equity</td>
<td>-35.41%</td>
<td>15.35%</td>
</tr>
</tbody>
</table>
Intel Mission Statement
Delight our customers, employees, and shareholders by relentlessly delivering the Platform and technology advancements that becomes essential to the way we work and live.

AMD Mission Statement
Lead through innovative, customer-centric solutions that empower businesses, Enhance the digital lifestyle and accelerate global digital inclusion.

Notes to the above Matrix
1 - Please note that all financial information and ratios are based on the 2nd Quarter 2007 results as released by both AMD and Intel

2 - Consumer processor prices are based on the information available at the time from the North American Online Retailer: http://www.newegg.com (August 26 2007)

3 - Key Ratios and other financial statistics were gathered using Yahoo Finance

4 - All other information was constructed by the researcher using information available at the time from websites like Dell.com, Walmart.com, AMD.com, and Intel.com
Appendix 13

Glossary of Terms (American Heritage Dictionary)

ATI – Array Technologies Incorporated

AMD – Advanced Micro Devices

Blu-ray - One of two next-generation (post-DVD) optical disc formats designed for storage of high-definition video and data. Developed by Sony, the name is derived from the blue-violet laser used to read and write the disc.

CDP – Consumer Decision Process

CPU - central processing unit: the key component of a computer system, which contains the circuitry necessary to interpret and execute program instructions.

FMA – First Mover Advantage

GCMM – Global Consumer Microprocessor Market

HP – Hewlett Packard

Laptop - a portable, usu. battery-powered microcomputer small enough to rest on the user's lap.

LCD – Liquid Crystal Display

Linux - A trademark for an open-source version of the UNIX operating system.

MP3 - the file extension for MPEG Audio Layer-3, a set of standards for compressing and downloading audio files from the Internet.

OEM – original equipment manufacturer

OS – Operating System e.g. Windows XP, Mac OS X

PC – Personal Computer

PDA – Personal Digital Assistant

PR – Public Relations

Processor - A part of a computer, such as the central processing unit, that performs calculations or other manipulations of data.

PRC – People’s Republic of China

RAM – Random Access Memory
Social Networking - a website where one connects with those sharing personal or professional interests, place of origin, education at a particular school, etc.

Star Trek - A television series of the 1960s, and later a series of successful films, in which a group of space explorers in their craft, the Enterprise, traveled through interstellar space.

Success - The achievement of something desired, planned, or attempted: attributed their success in business to hard work.

Transistor - a semiconductor device that amplifies, oscillates, or switches the flow of current between two terminals by varying the current or voltage between one of the terminals and a third: although much smaller in size than a vacuum tube, it performs similar functions without requiring current to heat a cathode.

Underdog - One that is at a disadvantage.