

Critical Analysis Into How Intel Misuses Its Monopoly Power To Continue Its Monopoly Grip On The Cpu Market By Breaking Antitrust Laws Or National And International Competition

A Case Study On The Antitrust Cases Between Amd And Intel

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Abstract

Since the 1960s, the semiconductor industry has been a driver of global economic growth and social change. The widespread application of semiconductors has transformed communication, computing, entertainment and industry. This very young fast growing industry embraced rapid technological change, and transmitted to the rest of the economy. Almost all the aspects of the economy have been affected by the electronics equipment, which drives its capability from integrated circuits.

Economist has sought to understand the relationship between market structure and innovation to inform policy governing antitrust, patent regulation, and economics growth. Patents, copyrights and trade secrets- the primary forms of intellectual property play an increasingly central role in our economy. Many companies consider their intellectual property to comprise their corporate crown jewels. Intel attaches enormous value on the patents that it has obtained, and the trade secrets it controls in the semiconductor field. Intel invested billions of dollars each year in R&D, which have rights to earn a return by rely on Intellectual property rights. The antitrust law is used to formulate with the purpose of promoting competition. Advanced Micro Devices (AMD) accusing the Intel for misuses its monopoly power to continue its monopoly grip on the CPU market by breaking the antitrust law or National and international competition.

The author adopted quantitative research strategy to collect the data. Additionally, a survey was conducted in which 130 respondents are responding to the questionnaire set by the author. Furthermore, finding of the research shows competition is most important factor to attract the customers by incredibly invest on the R&D research program. Settling disputes between the two big semiconductor firms by agreeing on the cross licensing Intellectual rights use. Finally, a conclusion made in accordance with the aim and objectives of the research study.

INTRODUCTION

The *aim* of the research is to critical analysis into how Intel misuses its monopoly power to continue its monopoly grip on the CPU market by breaking 'Antitrust laws or national and international competition'. A case study on the antitrust cases between AMD and Intel.

There are four objectives that are identified below:

- 1) To undertake the examination of growth of semiconductor companies that contributes to the creative and innovate high tech technology.

- 2) To analyze the growth strategies of Intel and AMD over the years on price assault in competitive market and to evaluate the extent to which Intel's precompetitive price discounting and rebate win the CPU business.
- 3) To conduct a comparative analyses of antitrust cases between Intel & AMD and also identify the strategic abuse of antitrust law.
- 4) To provide a conclusion where strengthening the antitrust authority or inadequacies exist and make possible recommendation on how to improve the competition among high tech semiconductor companies.

This study also focuses on the recent development in U.S. Federal Trade Commission and European Commission towards monopolists' system innovation. It also highlights on comparative economic analysis of U.S and EU law over Intellectual Property and Antitrust.

The semiconductor industry has been growing in the past pace for last decade. More advances in high speed computing and electronics is the result from the growth of semiconductor industry. With the much faster increase in speed of microprocessor speed have enabled the companies to access and analyze data rapidly, improving the business efficiency and developing a space for new products in competitive market globally. Between 1995 to 2007, semiconductor manufacturers and research groups including OEM (Original Equipment Manufacturer) made a significant investment in the high technology infrastructure that help to make a smart and highly efficiency products delivered to the customer. In this technology era, scientific equipment, software and embedded system development enable the production of products. Without any investment in the R&D, the industry would have otherwise been less efficient in making new product, including higher glitch or defect rates and greater manufacturing costs, all of which would have come to the market with higher prices and lower product quality and slower processing speed.

There are several forms of structural change simultaneously undergoing in the global semiconductor industry. The market structure is shifting from one dominated firm to more diverse array of heterogeneous niches, resulting from global diffusion of the internet and wireless communication applications. The shifting the structure of manufacturing activities by one dominating firm by IDM (Integrated device manufacturers) which involves in both architect design and fabrication of the semiconductor components, to one characterized by vertical specialization, where many other firms works either on the Design and marketing (Fabless firms) or fabrication foundries.

As the industries growth goes high, market demand and human resource or technical expertise are growing in the geographical areas such as India , China, Malaysia, Singapore that were less prominent actors in the global industry. Many firms are build or utilize the innovation of the others high technology firms or often in the pace of short product life cycles.

1 RATIONALE FOR THE RESEARCH

The area chosen for this research was to examine the semiconductor business by doing the aggressive price competition- specifically the discounts and rebates provided to the retailers and customers to win their business. The main topic of this area to analyze the antitrust cases

between the AMD and Intel. Semiconductor industry over last 40 years has grown much rapidly than any other industry. Intel who enjoyed the 80% market share in the semiconductor supplies want to dominate the market in every possible way so that other rival companies doesn't stand in front of their high tech product and innovation.

AMD's challenge to Intel's precompetitive price discounting and the violation of the antitrust law either national or international. The Antitrust law made by the federal government of US to protect the consumers – by ensuring that consumers get the best deal of product in the market at the lowest possible price. The Antitrust law mainly encourages such competition affirmatively. It doesn't protect competitors from aggressive, relentless competitions. It must be necessary to compete hard and negotiating aggressively by anticompetitive fashion to convince the customer to buy your products and not from your competitor's is what competition all about. By providing the huge pricing discounts to the OEM suppliers and rebates to the retailers and shops to win business is what called pro-competitive. Competing to win and winning the market by dominating product provided to the customer needed on timely basis i.e. winning the customer's business is precompetitive. That's what Intel did and is going with their marketing strategy today. Intel competed very aggressively by offering attracting prices to win as much business as it could be, it always taking into the consideration of all discounts, rebates and other price concession, while pricing the microprocessor above the cost.

2 GROWTH OF SEMICONDUCTOR INDUSTRY

In the last two decades, the most successful high tech industries are depend on the personnel computer and wafer foundry in the semiconductor industry. These high tech industries are now known for innovation on the application level are more important than the technology driven alone(Bettina & Anna,2009).

Companies are now focusing on the service innovation:

- ❖ Product can be in the form innovation business model pack
- ❖ Extend the value creation activity for customer by the OEM and ODM (Original Equipment manufacturer and Original design manufacturer) firms.
- ❖ Enhancing the cooperation with the upstream, downstream and the competition to middle customer's value.
- ❖ Innovation in the traditional service industry.

According to Mitsuru (2010), the two new conception management drivers characteristic of Japanese companies are, first is the Creativity view for cultivating advanced technology sectors and new business. The innovation in the consumers' electronics, communication device, and semiconductor field, collaborating and coordination among industries, which is important management driver determining the horizontal and vertical boundaries. Second is the dialectic view that is company's internal and external knowledge compatibility forms (win win relationship) which is important for building a corporate knowledge integration model.

The separation of the semiconductor design and manufacture leads to the major business innovation in the high tech industry. Such as Intel has a monopoly of attaining the CPU market, Qualcomm (US Company), have monopoly in mobile phones in North America, similarly major global share of semiconductors for graphic image processing is acquire by nVIDIA.

3 EVOLUTION OF COMPETITION FROM AMD

In 1982, Intel announced the more powerful 80286, which is going to be used in IBM machine PC/AT But IBM decided not to give Intel monopoly power so they want second alternative source of vendor who can provide x86 and 80286 processors. At IBM's request, AMD signs an agreements serve as a second source to Intel for IBM PC microprocessor. Intel had given the license to AMD to produce the chip. AMD started coping the 386 instructions and developed on its own with respective of Intel trying to force the injunction barring AMD for not to use its microinstruction in their fabrication facilities. In 1987, Intel want AMD to away from his

deal for IBM PC's that it have second alternative source of x86 chips but actually planning of getting the important source project i.e. having secret a plan for maintaining and acquiring monopoly in x86 chips. AMD countersued Intel claiming over its license including the microinstruction. In 1992, legal dispute was settled and Court awarded AMD \$10 million after hearing on Intel-prospective return to competition and able to get license to fabricate the Intel x86 based architecture microprocessor in nonexclusive and royalty free fashion. AMD settled its all outstanding disputes with Intel and starts independently designing x86 microprocessor, the AMD-K5.

At the end of the decade, AMD's Athlon processor is the first chip to break the historic 1GHz(One billion clock cycles per second) speed barrier in 2000 (AMD, 2011). In 2003, AMD introduce its Opteron microprocessor for servers which also major technological breakthrough in high tech innovation because of having access to the 64-bit processing concurrently running the 32 bit software run into it. In this manner, Intel failed to achieve the industry expectation on designing the 64 bit processing Itanium microprocessor based on the Intel's proprietary instruction set.

AMD put his best to provide better performance in achieving the higher speed; it introduced the first Dual-Core x86 microprocessor in 2004. This is one of the innovation milestone achieved by AMD. AMD capture the x86 based microprocessor market by its unit share almost 25 percent because of continue improving its technology success. AMD's unit share of sales to major OEMs during that time has also remained well below 25percent.

Figure AMD vs Intel market share (Updated 19th August 2011)

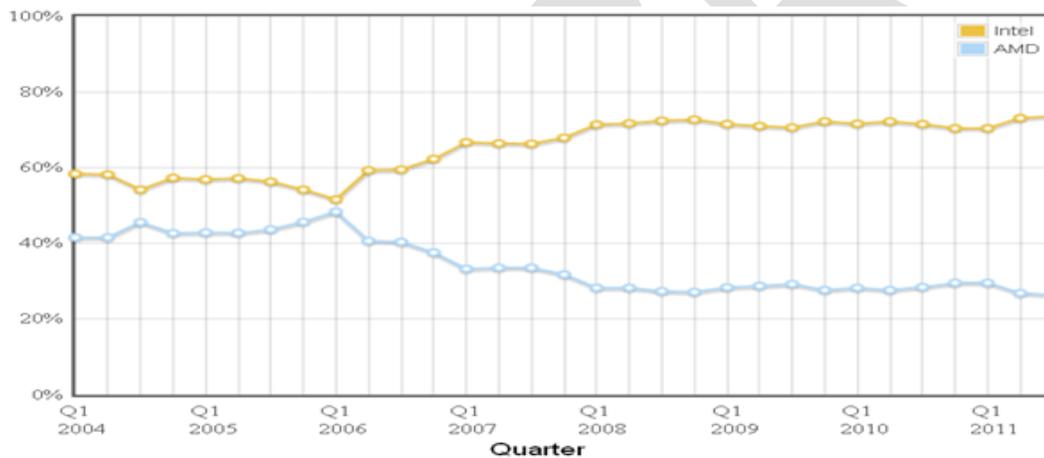
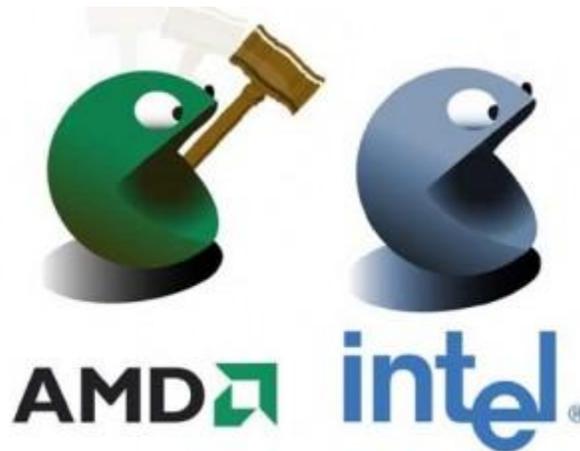


Figure: Adapted from www.engadget.com (2011)

4. ANTITRUST LAWS

“Antitrust laws are the Magna Carta of free enterprise. This is one of the important mechanisms to protect the economic freedom as well free enterprise system as the Bill of Rights is to the protection of our fundamental personnel freedoms. (United States v.Topco Assoc. Inc., 405 U.S. 596, 610 (1972))



I. Overview of Antitrust Law:

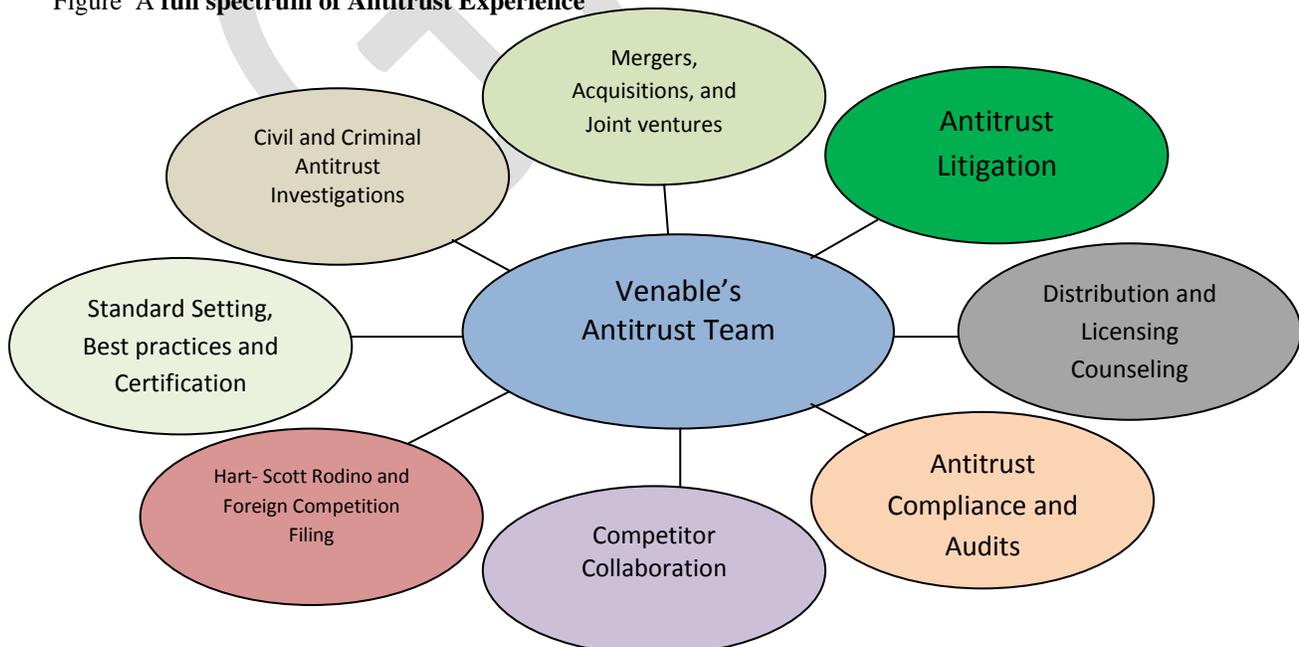
The main purpose of promoting the federal antitrust law is to control private economic power by promoting and encouraging competitions. Competition maximizes consumer welfare. According to Lynda (2010), **Competition** is believed to:

- ❖ Achieving higher quality by keeping costs and prices lower
- ❖ Encourage for more innovation in product & service and efficient allocation of resources.
- ❖ Provide broader choices to the consumers in the marketplace.

There are three main *elements* of the Antitrust Law are:

- ❖ Prohibiting agreements or practices that restrict free trading and competition between business
- ❖ To stop the abusive behavior of the firms which practices tying, refusal to deal, predatory price, rebate and bonus schemes and many others, to dominate the market in anti-competitive practices manner.
- ❖ To keep supervising the company's merger and acquisitions of the firms, including some joint ventures. It is necessary to check the access to facilities or license agreement to the company to enable other rival or competitors to continue competing with same technology.

Figure A full spectrum of Antitrust Experience



Source: Adapted from the Author (2011)

There are four main act presented in the Federal Antitrust law.

- a) **The Sherman Act**
- b) **The Clayton Act**
- c) **The Robinson-Patman Act, and**
- d) **The Federal Trade Commission (FTC) Act**

Every act is different from each other, designed to reach certain types of anticompetitive behavior (Keith Hylton, 2010). Many economics concept such as supply and demand curves, structure of market, cost & revenue, merger and acquisition etc are the main influenced in the courts analyses of the antitrust statues.

II. Amd and intel international antitrust cases

According to market research company I.D.C.

Between 2003 and 2004

- ❖ Market share of AMD's in Japanese computers industry dropped from 16% to 14%.

By 2005

- ❖ x86 based processor architecture are installed in more than 80% by Intel.

i. Claim filed in Japan by AMD

June 2005

- ❖ Claim received by the Tokyo high court and Tokyo District court.
- ❖ \$50 million been claimed by the AMD in damages
- ❖ Fair trade commissioner of Japan verified the AMD claim over Intel huge interference with the PC manufactures.

ii. AMD allegation found correct about Intel marketing strategy

July 2005

- JFTC investigations turned up the deal between major OEM, such as NEC, Fujitsu, Toshiba. Sony, Hitachi etc
- This deal is totally violating the Japanese anti-monopoly policy,
- Manufacturing companies has to accept other x86 chip developers.

iii. Intel violating the Antitrust laws in Germany

July 2006

- Major retailer of PC's called Media Markt is accused of non stocking the PCs fitted with AMD chips.

September 2006

- Investigation started by the European commission between German Intel and Media Markt deal.

b. EVALUATION OF INTEL’S MONOPOLY PROFIT

According to the report by Dr. Michael A. Williams (ERS Group) on the Intel’s monopoly profits from the sales of Microprocessors are

Table Economic Studies of how much Intel Benefits

Intel's Total Profit (Total return 25.95%)	\$ 141.8 billion
Competitive Profits (Cost of capital 9.94%)	-54.2 billion
Results: Economic Profits (Economics return 16.01%)	\$87.7 billion
Portion of Economic Profits Attributed to assumed advantages (5.0%)	27.3 billion
Result: Monopoly Profits (11.01%)	\$60.4 billion

Source: Created by the Author (2011). Adapted from www.4-traders.com (2011)

Table Economic study of consumers benefit if Intel has fewer market shares

Intel microprocessor ASP - 2006	\$ 121.12 billion
Intel microprocessor ASP - 2011(projected)	101.3 billion
Total price reduction for computer manufacturer	\$19.82(16 percent less)
Saving passed on to consumer	75%
Total consumer savings per computer	\$14.87, or 1.5% of a \$1000 performance desktop Computer

Source: Created by the Author (2011). Adapted from www.4-traders.com (2011)

- i. **Final Result:** Over \$80 billion can be saved from the free competition over the next decade: \$61 billion for consumers and \$20 billion for computer manufacturers.

5 ANALYSIS OF THE SURVEY RESULTS

The author conducted a survey by asking the questionnaire to the peoples. Questionnaire contains 20 questions were asked to 170 peoples to different age groups. Author expected a response from at least 150 but only 130 participants responded to the author survey. In this questionnaire, author asked 5 demographic and 15 specific questions. This survey is purely based on the aim and objectives of the research.

Table : Survey Statistics

SURVEY STATISTICS	
Number of Questions	14

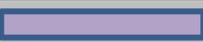
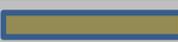
Total Responses	130
Expected Responses	145
Response Rate	89.6%

Source: Created by the Author (2011)

i. Age of Respondents

The below represents the respondent age group in the survey. According to the survey, 34.61% of the respondents are in the age of 29-39, it is then followed by participant at the age of 39-49 with 28.46%. 49 and over age group is marginally behind the age group of 39-49 by having 29 respondent and the rest of the respondents are 19 people with 14.62%.

Chart 4.2: Age Group of Respondents

2. Which age group are you in?			Response Percent	Response Total
1	18-29		14.62%	19
2	29-39		34.61%	45
3	39-49		28.46%	37
4	49 and over		22.31%	29
Statistic based on 130 respondent(s) 0 Skipped				

Source: Created by the Author (2011)

1. Author's Interpretation and Chi-Square Test Analysis

It is clear from the above chart mention that younger generation have little knowledge about the current market trends. The age group between 29-39 (45) and 39-49 (37) shows that they are more concern about the national and international competition over the product branding and very much enthusiastic about the high tech gadgets coming into the market with knowledge about the hardware used inside. The respondent from age group 49 and over (29) are actively watching the current scenario adopted by Intel and AMD marketing strategy to overcome their differences by mutually agreement on settlement of IP disputes between themselves. Chi squared equals 2.910 with 3 degrees of freedom and two-tailed P value equals 0.4058. By conventional criteria, the difference is not statistically significant

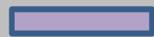
Table Chi-square Test Results of the Age of Respondents

Age Group	Observed	Expected	Expected (%)
18-29	19	15	11.54%
29-39	45	49	37.69%
39-49	37	32	24.62%
49 and over	29	34	26.15%
Total	130	130	100%

Source: Created by the Author (2011)

ii. The Education Level of Respondents

Chart **Education levels of respondent.**

3. What is the highest level of education you have completed			Response Percent	Response Total
1	High School		6.15%	8
2	Bachelor's Degree		28.46%	37
3	Master's Degree		45.38%	59
4	Doctorate Degree		10.76%	14
5	Professional Degree		9.23%	12
Statistic based on 130 respondent(s) 0 Skipped				

Source: Created by the Author (2011)

Education Level	Observed	Expected	Expected (%)
High School	8	5	3.85%
Bachelor's Degree	37	41	31.54%
Master's Degree	59	53	40.77%
Doctorate Degree	14	12	9.23%
Professional Degree	12	19	14.62%
Total	130	130	100%

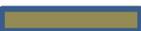
Source: Created by the Author (2011)

iii. Yearly Revenue of Respondents

The following **chart** shows the yearly income of the respondents. The survey results shows that 35.38% of the respondent (46) earns between £10,000 to £ 30,000 per annum, which is then followed by the respondent who is earning between £30,000 to £50,000 per annum are 39. Moreover, the author found that 23.8% of the participants (31). Finally 10.77% of the total respondents (14) are earning less that £10,000.

Chart : **Yearly Income of Respondents**

4. What is your yearly household income?			Response Percent	Response Total
1	< £10,000		10.77%	14
2	£10,000 - £30,000		35.38%	46
3	£30,000 - £50,000		30.00%	39

4	£50,000 and more		23.85%	31
Statistic based on 130 respondent(s) 0 Skipped				

Source: Created by the Author (2011)

1. Author's Interpretation and Chi-square Test Analysis

Author has conducted survey and realised that the majority of the participants (46) having the earning between £10,000 to £30,000 in a year are mostly from the age group of 18-29 . Same thing is following for the age group of 29-39, whose earning is upto £50,000 in a year with 39 number of the respondents in the survey. The Chi squared equals 4.008 with 3 degrees of freedom and the two-tailed P value equals 0.2606. By conventional criteria, this difference is considered to be not statistically significant .

Table : Chi-square Test Results of the Income of Respondents

Yearly Revenue	Observed	Expected	Expected (%)
< £10,000	14	12	9.23%
£10,000 - £30,000	46	49	37.69%
£30,000 - £50,000	39	43	33.08%
£50,000 and more	31	26	20.00%
Total	130	130	100%

Source: Created by the Author (2011)

iv. The Country of Origin of Respondents

The below **Chart** shows the country of origin of respondents. Its shows that the majority of the participants are from Asian background (Indian, Pakistani, Bangladeshi, other Asian) with 34.61% (45 respondents). It is then followed by the people who have white background (British, Irish and other white) with 24.6% (32 respondents). Furthermore, mixed background and Black or Black British are nearly equally responded to the author questionnaire with 17 & 19 respondents. Moreover, people from oriental background such as Chinese and Japanese are 8.4% (11 respondents). Finally, the rest of the people from different origin such as Turkish, Iranian etc are 6 in numbers.

Chart : Country of Origin of Respondents

5. What is your country of origin?			Response Percent	Response Total
1	White (British, Irish or other white)		24.61%	32
2	Mixed (White and Black Caribbean, White and Black African, White and Asian, other Mixed)		13.07%	17
3	Asian or Asian British (Indian, Pakistani, Bangladeshi, other Asian)		34.61%	45
4	Black or Black British (Caribbean, African, other Black)		14.61%	19

5	Oriental (Chinese, Japanese)		8.46%	11
6	Other, please specify		4.61%	6
Statistic based on 130 respondent(s) 0 Skipped				

Source: Created by the Author (2011)

Chi-square Test Results of Country of Origin of Respondents

Country of Origin	Observed	Expected	Expected (%)
White	32	40	30.77%
Mixed	17	13	10.00%
Asian or Asian British	45	38	29.23%
Black or Black British	19	23	17.69%
Oriental	11	9	6.92%
Other	6	7	5.39%
Total	130	130	100%

Source: Created by the Author (2011)

v. Does companies took benefit from antitrust law?

The Chart illustrates the results of the opinions from respondents as strongly agree, Agree, and Neutral, Disagree and strongly disagree. It shows that 19.2% of the total respondent (25 respondents) agrees with the statement that companies took benefit from antitrust law while 25.38% (33 respondents) are staying neutral. Majority of the people (39 respondents) are disagreeing with that statement and 16.1% of respondents are strongly disagreeing.

Chart: Companies took benefit from antitrust law.

11) Are companies/firms taking benefit from antitrust law by claiming huge amount from the successful rivals?			Response Percent	Response Total
1	Strongly Agree		9.23%	12
2	Agree		19.23%	25
3	Neutral		25.38%	33
4	Strongly Disagree		16.15%	21
5	Disagree		30.00%	39
Statistic based on 130 respondent(s) 0 Skipped				

Source: Created by the Author (2011)

1. Author's Interpretation and Chi-square Test Analysis

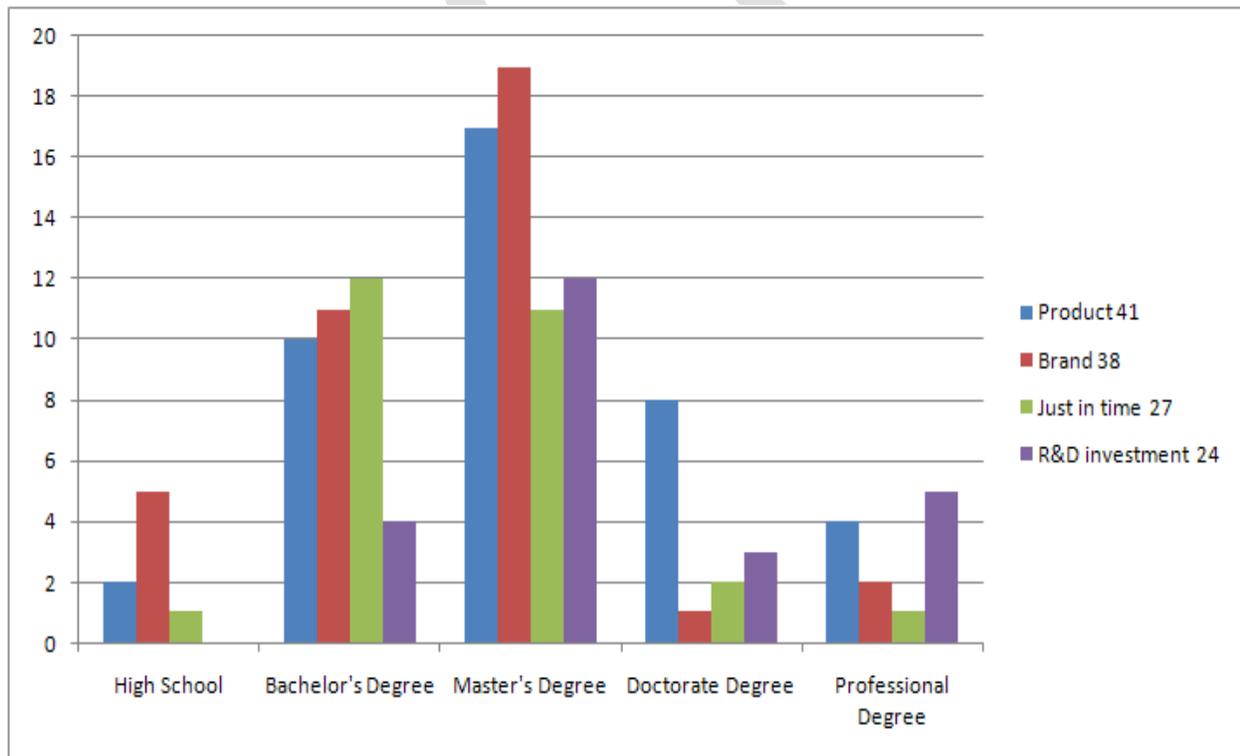
As it is shown in the **Chart** , most of the respondent 16.1% and 30% of total (60 respondents) are not in favour of companies/firms took benefit from the antitrust law by claiming the huge amount from the successful rivals. They want free competition in the market while keep pace with the innovative product launch. While others respondent 9.2% and 19.2% of total (37 respondents) are seen the strategic abuse of the antitrust law for their own benefits (or takes huge claim from the successful rivals). Chi squared equals 5.732 with 4 degrees of freedom and the two-tailed P valued equals 02201. By conventional criteria, this difference is considered is to be statistically significant .

Companies took benefits from antitrust law	Observed	Expected	Expected (%)
Strongly agree	12	15	11.54%
Agree	25	28	21.53%
Neutral	33	35	26.92%
Strongly disagree	21	24	18.46%
Disagree	39	28	21.54%
Total	130	130	100%

Source: Created by the Author (2011)

Source: Created by the Author (2011)

Chart : Graphical representation of the relationship between CPU market competition and Education of the respondents



Source: Created by the Author (2011)

6 CONCLUSION

US semiconductor companies have adapted to aggressive global competition by developing smart technology and leadership products such as microprocessors, graphic processing units (Handel Jones, 2010). Many of the software developers and computer chips maker are now a day's more dependable on one another for seeking opportunities of growth to gain competitive advantages i.e. Intel and Microsoft have close relationship over the control of the microprocessor architecture for Microsoft operating system software. While U.S antitrust law enforcing the agencies to take action against the firms whose conduct has impact on the competition. The laws emphasize on promotion of the competition for more innovation products that benefit to the consumer. Federal trade commission should require coordination with other countries such as EU , EU, Japan, China etc to prohibits the vertical agreement, price fixing, barrier to entry etc that restrain competition within the common market.

According to research report from RNCOS (Specializes in industry intelligence in industry intelligence and creative solutions for contemporary business segments), "Semiconductor Industry Forecast to 2012", the global semiconductor market will grow at a CAGR of around 6% during 2011-2014. Mostly Asian pacific region i.e. China and India will increase the demand of semiconductors mainly on industrial sector, such as automotive, aircraft, telecommunication and wireless devices etc.

According to the result of the survey, majority of the people wants semiconductor industry to set up their plants or tie with manufacturer companies to increase their production rate. Interestingly many respondents give their opinion on how they will improve the market share. Companies should tie up with the global companies to lower the burden of setting up the fabrication unit. It cost \$2 billion to \$ 5 billion to set the new plant to be operational. To reduce the sunk cost, companies are preferred to tie up so that they can target the new market with effective advertisement.

LIMITATIONS OF THE RESEARCH

The author has faced several limitations when writing the research study. First of all, very short time was given to the researcher to finish the research study. In this period, author faces difficulty to analyse the gathered data from the survey while writing the data analysis and finding of the study. Moreover, the participants are taking long time to give the answer to the questionnaire as it has to understand the actual fact of the current market scenario. Author gives some brief information about the questionnaire to the respondents, and sometime it difficult to analyse their answer. Therefore author took long time to analyse the collected data. Furthermore, finding the exact information for the literature review is difficult for the researcher. Understanding the antitrust law, competition strategy is recent information which is difficult to get the resources.

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