

## Case Study #4, The Texas Instruments Home Computer

1. In the 1970s, Texas Instruments already had a moderate-diversification product portfolio, with mostly related diversification. A Texas Instruments engineer, Jack Kilby, invented the integrated circuit in 1958 (Carbone, 2008); much of TI's product portfolio at the time grew from that invention. TI had a measure of vertical integration, in that many of the products that TI manufactured, such as their calculators, used the outputs of their semiconductor manufacturing business, such as processors and memory. For example, the TI-2500 calculator, the first consumer product from Texas Instruments, used a Texas Instruments-made application specific integrated circuit (Tout, n.d.).

As a thought exercise, if one examines corporate-level strategy when restricted just to their home computer business, however, Texas Instruments had a low-differentiation, value-creating strategy. The TI-99/4 was TI's only product aimed at the home market. It only had one price point and no options whatsoever; it could not even be purchased without a monitor. This was as low-differentiation as a corporate-level strategy can be.

The strategy was definitely value-creating. TI had no home computer business at the time, and were trying to expand into that market. The home computer market was immature at the time, with the first microcomputer processors from Intel only having been released in 1971 (Mazor, 1995). TI had the opportunity to create a valuable business in the home computing market.

TI used a differentiated strategy with the TI-99/4. It was the first 16-bit home computer available ("TMS9900 CPU", n.d.); there truly was nothing on the market quite like it at the time. It is difficult to overestimate the impact that a 16-bit TMS9900 processor had not only on performance both performance and capability; it allowed the TI-99/4 to support larger integers and to more easily address larger amounts of memory than the competition. This differentiated offering also came with a differentiating price; the original TI-99/4 was priced at \$1150 ("A brief history...", n.d.; "Texas Instruments TI-99/4 computer", 2014), well above all of the competition for the home computer market.

2. TI's approach to the personal computer makes it appear that they treated the TI-99/4 as a star, whereas in reality it was a question mark. TI's approach to product design indicates that they felt like they had won the personal computer war before the first shots were even fired, and planned to extract as much profit from it as possible through various means; these actions included charging licensing fees from developers, locking developers into TI's proprietary programming language, and locking customers into TI's proprietary cartridge format, making it difficult for them to buy their next PCs from any other manufacturer. These types of actions tend to be taken by monopolists attempting to extract as much profit as possible from a market that they have already cornered, and not a company gearing up to compete in a market that has not yet been won. One only has to look at the best example of a monopolist in the PC software market, Microsoft. They have used similar strategies to create vendor lock-in in their software. While it was not unusual for developers to use proprietary binary formats when Office was being written, Microsoft's decision to create the Office Open XML format for Office 2007 rather than use the Open Document Format used by OpenOffice.org and other office suites is suspected to be a decision intended to keep users locked to Microsoft Office (Mohamed, 2005). TI was attempting to make a similar move, however their home computer business had not yet developed the market share that Microsoft Office enjoys.

The home computer market at that point was a major growth area (Feder, 1981). Cash cows are high market-share products in a mature, low-growth market. Dogs are low market-share

products in a mature, low-growth market. Because the home computer market was a high-growth market, neither of these labels apply to the TI's home computer.

The TI PC was not a sure thing. TI had no prior history in the home computer market, as this was its first entry into that market. With no history in the market - meaning no market share - and with TI attempting to fill an unproven niche within that market, treating the TI-99/4 as a star was incredibly premature. TI should have treated its home computer business as a question mark. If TI had succeeded in capturing a large market share with its first home computer, it could then have adjusted its strategy and treated its home computer line as a star.

3. The main reason that TI's home computer line was unsuccessful was that the TI-99/4 provided hardware that was far more capable than what the market was demanding at the time. Disruptive innovations typically come from the most advanced technology that users are ready to adopt, not the most advanced technology available at the time (Andersen, Froholdt, & Poulfelt, 2010). TI attempted to sell an incredibly advanced - and therefore incredibly expensive - product that the public was not ready for, while other companies, such as Commodore, were selling less advanced products that met the market's needs at prices that customers were willing to pay.

Another large reason that TI's approach to a home computer was unsuccessful was that it was not consumer-friendly or developer-friendly in any way. Selling a computing platform is always a chicken-and-egg problem; there has to be enough software available to entice buyers, or there must be enough buyers to entice developers ("Platform seeding strategies", n.d.). TI had neither, but planned its strategy as if it had both. It was unfriendly to consumers because it was priced way above its competitors, its software prices were all padded by ROM cartridge royalties, and its only competitive advantage was its processor speed. It was unfriendly to developers because despite the 16-bit architecture its memory was limited, they had to surrender a portion of their software revenue to TI in the form of royalties, they were locked into a proprietary programming language if they wanted to use the cartridge format, and they were limited to unreliable cassette drives and the BASIC programming language if they chose not to use cartridges. This left TI in a situation where it could attract neither group initially, and no path forward to attract the other group.

Another factor that played into TI's failure is that in computing, the more open platform nearly always wins. The PC market (formerly referred to as IBM-compatible market) became dominant because there were multiple manufacturers making processors, multiple operating system vendors, multiple computer manufacturers, and multiple peripheral makers ("Computer history 101...", 2011). Windows became the dominant operating system because it ran on hardware from a large number of vendors, while its primary competitor, OS/2, had little driver support for non-IBM hardware (Reimer, 2013). Android is the dominant platform for cellular phones because it runs on hardware from multiple vendors. Linux is the only outlier being that in many ways it is the most open operating system, but it has always been competing against Windows with less hardware and software support. Even Apple's Macintosh platform has seen much greater success since Apple made the transition to industry-standard Intel processors, allowing the installation of other operating systems to run alongside OS X (Dalrymple, 2007). While there are other factors at play in Apple's transition to Intel and correlation does not imply causation, it is reasonable to believe that compatibility was a factor in reducing buyer reluctance to buy a Macintosh over a standard PC. History has shown that buyers prefer choice, and TI did not offer it. Its operating system was proprietary, its hardware was proprietary, its peripherals

were proprietary, its software cartridges were proprietary, and even its programming language was proprietary.

It is worth comparing TI's failed approach to what is inarguably the most successful approach to home computer marketing, the development of the original IBM PC. While TI developed proprietary systems in an attempt to lock their customers to their products, IBM outsourced the component development of the PC and insisted that their partners develop parts according to standards ("The birth of the...", n.d.). Intel provided the processor in the original PC, and Microsoft provided the operating system. This level of interoperability created a sustainable platform that did not lock customers into hardware or software from any one vendor, creating a platform that endured for decades while the majority of the closed proprietary platforms, such as those from Commodore, Atari, and many others have been long since abandoned. IBM's approach was not perfect because IBM did eventually lose control of the platform to the point where they have now exited the home computer market, however this imperfect execution does not mean that the strategy could not have been a long-term money-maker for the company.

4. Texas Instruments should have reversed their marketing strategy completely, and focused on adoption of their platform before attempting to extract the maximum amount of revenue from it. TI attempted to use their brand recognition and reputation for market-leading technology at reasonable prices, hoping that it would allow them to sell an expensive computer with features that few people at the time were able to use and that would lock the customer into providing a never-ending stream of revenue in the form of software royalties. Instead, TI should have used that brand recognition to attract the attention of buyers into a reasonably-priced, technologically-capable, consumer-friendly platform that could have endured.

Most businesses never turn a profit. Larger businesses tend to take a significant period of time before they ever do have a profitable quarter, and an even longer amount of time before they consistently turn a profit. For example, twenty years after its founding, Amazon does not make a consistent profit (Mac, 2015). Also, Microsoft released its first game console, the Xbox, in 2001, and its Xbox business did not have a profitable year until 2008 (Hartley, 2008). While there must always be a strategic path toward profitability when embarking on a new business venture, the product should not be designed with monetization as its top priority, and the business owner should not expect to earn an immediate profit on such a large business venture.

In order to build this new line of business, Texas Instruments should have designed its one product to attract customers and developers, rather than to trap them with its proprietary cartridge format and programming language. Because of the rapid rate of microcomputer development at the time, consumers always had to contend with the fear that their purchases will quickly become obsolete when they set out to buy a computer (Manes, 1995).

TI also made a major error with the specifications and cost of components in the TI-99/4. Although TI's hardware was superior to what its competition was offering at the time, the TI-99/4 was also considerably more expensive than its competitors offerings. TI needed to assess whether there truly was a market for home computers with its superior hardware; had they done so, they might have learned that there was little demand for an \$1,150 PC at the time regardless of its technological superiority, and could have then designed their hardware to meet market demand. Differentiation is a viable business-level strategy, however in order for a differentiated offering to succeed, there must be demand for it. The failure of TI's home computer line is an indication that they were producing a computer for a market segment that did not exist.

## References

- Andersen, M.M., Froholdt, M., & Poulfelt, F. (2010). *Return on strategy: How to achieve it!* New York, NY: Routledge, Taylor & Francis Group.
- The birth of the IBM PC. (n.d.). Retrieved July 16, 2015, from [https://www-03.ibm.com/ibm/history/exhibits/pc25/pc25\\_birth.html](https://www-03.ibm.com/ibm/history/exhibits/pc25/pc25_birth.html)
- A brief history of the TI-99. (n.d.). Retrieved July 19, 2015, from <http://www.mainbyte.com/ti99/history/history.html>
- Carbone, J. (2008). The integrated circuit turns 50. *Purchasing*, 137(10) Retrieved from <http://proxy.tamuc.edu:8012/docview/214444674?accountid=7083>
- Computer history 101: The development of the PC. (2011, August 23). Retrieved July 19, 2015, from <http://www.tomshardware.com/reviews/upgrade-repair-pc,3000-4.html>
- Dalrymple, J. (2007, July 25). Apple reports \$818 million profit, record Mac sales. Retrieved July 19, 2015, from <http://www.macworld.com/article/1059141/appleearnings.html>
- Feder, B. J. (1981, January 7). Market growth focus shifts to microcomputer. *The New York Times*. Retrieved July 19, 2015, from <http://www.nytimes.com/1981/01/07/business/market-growth-focus-shifts-to-microcomputer.html>
- Hartley, A. (2008, July 18). Xbox group has its first profitable year. Retrieved July 18, 2015, from <http://www.techradar.com/us/news/gaming/xbox-group-has-first-ever-profitable-year-426621>
- Mac, R. (2015, April 23). With all eyes on web services, Amazon beats first quarter expectations but still lacks profits. Retrieved July 18, 2015, from <http://www.forbes.com/sites/ryanmac/2015/04/23/amazon-earnings-2015-first-quarter-web-services/>
- Manes, S. (1995, November 27). Consumer's fear of obsolescence is unavoidable when buying PC. *The Baltimore Sun*. Retrieved July 19, 2015, from [http://articles.baltimoresun.com/1995-11-27/business/1995331035\\_1\\_computer-hard-disk-leasing](http://articles.baltimoresun.com/1995-11-27/business/1995331035_1_computer-hard-disk-leasing)
- Mazor, S. (1995). The history of the microcomputer - invention and evolution. *Proceedings of the IEEE*, 12(83), 1601-1608. doi:10.1109/5.476077
- Mohamed, A. (2005, December 7). Fears on standards as Microsoft pushes Office Open XML format. Retrieved on July 19, 2015, from <http://www.computerweekly.com/news/2240076060/Fears-on-standards-as-Microsoft-pushes-Office-Open-XML-format>
- Platform seeding strategies. (n.d.). Retrieved on July 19, 2015, from <http://platformed.info/seeding-two-sided-businesses-strategy-chicken-and-egg-problem/>
- Reimer, J. (2013, November 24). Half an operating system: The triumph and tragedy of OS/2. Retrieved on July 19, 2015, from <http://arstechnica.com/business/2013/11/half-an-operating-system-the-triumph-and-tragedy-of-os2/>
- Texas Instruments TI-99/4 computer. (2014, March 15). Retrieved on July 19, 2015, from <http://www.oldcomputers.net/ti994.html>
- TMS9900 CPU. (n.d.). Retrieved on July 19, 2015, from <http://www.mainbyte.com/ti99/hardware/chips/tms9000.html>
- Tout, N. (n.d.). Texas Instruments 2500. Retrieved July 19, 2015 from [http://www.vintagecalculators.com/html/texas\\_instruments\\_2500.html](http://www.vintagecalculators.com/html/texas_instruments_2500.html)