Moore is Now Less? Intel Corporation’s Slowing Innovation Cycle – A Contemporary Financial Reporting Case Study: A Change in Accounting Estimate
Abstract

For over five decades, Intel Corporation relied upon Moore’s law (which predicts semiconductor innovation on a bi-annual cycle) as a guiding principle to drive its strategy, and research and development plans. After delivering on that innovation cycle for nearly 50 years, Intel announced delays in new product releases, reduced future pace of change, and related changes to the accounting treatment for its manufacturing equipment. In this case, students learn about Moore’s law, the implications of slowing technological innovation, and the related accounting, auditing and financial reporting matters.

Case

Learning Outcomes

By completing this case, students will:

• gain an understanding of Moore’s law, a commonly accepted innovation principle in technology industries;
• examine a change in accounting estimate related to equipment depreciation at a well-known public company;
• refer to the relevant authoritative accounting literature to consider the appropriate accounting treatment of a change in estimate and its related financial reporting effects;
• detail the implications of a change in accounting estimate for investors and analysts;
• detail the implications of a change in accounting estimate on company auditors.

Introduction

Intel, founded in 1968, is the world’s largest producer of semiconductor chips, most commonly used in computer technologies. Throughout its history, these chips have served as the foundation for innovations in personal computing and mobile technology by adhering to Moore’s law, which suggests that the number of transistors per integrated circuit should double every two years. Indeed, this constant set the pace for competitors and allowed Intel’s clients to design their own products around ever smaller, faster, more powerful processors.

In 2015, Intel sales exceeded $50 billion. Hewlett-Packard, Dell, and Lenovo accounted for 46 percent of the company’s revenue; however, recent declines in personal computer (PC) market demand have driven Intel to make strategic investments in other operating segments, namely their Data Center Group, Internet of Things Group, and Non-Volatile Memory Solutions Group. In fact, 2015 was the first year these operating segments made up the majority of Intel’s operating profit.

Even as Intel shifts its primary focus away from the PC industry, it believes that Moore’s law will continue to play an important role in its innovation cycle. Intel has set its sights on producing more integrated platform computing solutions, which are heavily dependent on its ability to produce hardware and software that uses increasingly less energy to process trillions of operations per second.

Moore’s Law
Gordon Moore, a co-founder of Intel, published an engineering research article in 1965, predicting that scientific advancement would allow for a doubling of the number of transistors per integrated circuit (i.e., semiconductor chip) every two years. This prediction held true for decades as innovation in technology and reductions in component size gave rise to mobile computing, digital photography, and other advancements. In recent decades, such innovation is credited with unprecedented progress in communications, data analytics, medicine, and economic development worldwide.

Moore’s law is far more than a theoretical engineering supposition – in fact, it has been a fundamental tenet of business decision-making at Intel since its inception. Recently, in the “Letter to Shareholders” to open the Intel 2015 10-K, Intel’s Chief Executive Officer (CEO) Brian Krzanich cited the critical role of Moore’s law to the company’s strategy and success, stating:

“Intel's relentless pursuit of Moore’s Law is foundational to our strategy and another valuable differentiator. Our manufacturing leadership allows us to continuously push the limits of performance and functionality. As a result, we expand the boundaries of technology to make the most amazing experiences possible. I’m proud that in addition to delivering solid financials that demonstrate our evolution, we delivered innovation.”

However, not all advancement is perpetual; in future decades the rate of change in specifications for hardware, capacity advances, and required production capability and capacity may be curtailed. Semiconductor chip size is typically measured in nanometers (nm) (with one nanometer equal to one billionth of a meter in size). Intel introduced its 22 nm feature width chip in 2012, followed by a smaller 14 nm release in 2014, and expects the next advancement to 10 nm in 2016. However, in 2015, Intel's CEO announced that the “last two technology transitions have signaled that our cadence today is closer to 2½ years than two” and that the next product release would be delayed by up to one year to 2017 (Clark, 2015).

Such a revision to the pace of innovation by the market leader suggests that a principle that held for nearly five decades will receive great scrutiny by industry engineers in the future. Prolonged technological advancement could hold far-reaching business implications for Intel, its customers, and the markets they serve.

Financial Reporting Change Announced

Consistent with the guidance in Accounting Standards Codification (ASC) 250-10-50-4 (Accounting Changes and Error Corrections), approximately six months after announcing the first expected departure from the biannual product revisions cycle in the company’s history, Intel noted the effect that the research and development (R&D) and production delays would have on a common accounting method, reporting:

“Management judgment is required in determining the estimated economic useful lives of our property, plant and equipment, which can materially impact our depreciation expense. Accordingly, at least annually, we evaluate the period over which we expect to recover the economic value of these assets. During the assessment performed in Q4 2015, we considered factors such as the lengthening of the process technology cadence resulting in longer node transitions on both 14nm and 10nm products. With those longer transitions, we added a third product to our 14nm roadmap. We have also increased re-use of machinery and tools across each generation of process technology.

As a result, we determined that the useful lives of machinery and equipment in our wafer fabrication facilities should be increased from four to five years. We will account for this as a change in estimate that will be applied prospectively, effective in Q1 2016. This change in depreciable life drives approximately $1.5 billion in lower depreciation expense for 2016. Approximately half of this benefit will increase gross margin (impacting both unit cost and start-up costs), approximately one-fourth will decrease R&D expenses, and the remaining one-fourth will result in lower inventory costs and end-
ing inventory values." (Intel 2015, 10-K, p. 38)

As shown in Figure 1, the company also disclosed this change in its related Property, Plant and Equipment footnote to the 2015 financial statements.

Figure 1. Property, plant, and equipment footnote from Intel 2015 (10-K, p. 75).

<table>
<thead>
<tr>
<th>Property, Plant and Equipment</th>
<th>Dec 26, 2015</th>
<th>Dec 27, 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land and buildings</td>
<td>$25,578</td>
<td>$22,989</td>
</tr>
<tr>
<td>Machinery and equipment</td>
<td>$48,459</td>
<td>$44,441</td>
</tr>
<tr>
<td>Construction in progress</td>
<td>$9,359</td>
<td>$12,279</td>
</tr>
<tr>
<td>Total property, plant and equipment, gross</td>
<td>$83,396</td>
<td>$79,709</td>
</tr>
<tr>
<td>Less: accumulated depreciation</td>
<td>$(51,538)</td>
<td>$(46,471)</td>
</tr>
<tr>
<td>Total property, plant and equipment, net</td>
<td>$31,858</td>
<td>$33,238</td>
</tr>
</tbody>
</table>

This departure certainly caught the attention of the financial press. Audit Analytics, an independent database and research provider focused on accounting and regulatory matters, reported: “We do not see changes in estimates of this magnitude every day. In fact, this is the largest depreciation-related change that had a positive impact on earnings that we have ever seen (going back to 2006). The $1.5 billion change represents about 10 percent of 2015 pre-tax income” (Usvyatsky & Pakaluk, 2016).

In the quarter following the disclosure of the change in the expected life of its productive assets, Intel revealed plans to eliminate 12,000 jobs, a reduction of approximately 11 percent of its workforce (Kim, 2016).

Implications

Financial statements, by design, are prepared and presented to ensure management accountability and to provide insight into business operations. Any change in accounting methods and estimates affects comparability across time and against other companies. Changes in accounting practices are of particular relevance to a company’s auditors, who should consider not only the tabulations that support the financial statements, but also the broader impact of these changes and the effect of changing market forces on their client’s business. Often, a change signals the need to look more closely at fundamental operating assumptions and the future performance of an enterprise. For example, in retail a decline in new store openings may signal a need for closer review, or in aviation, the indicator may be an airline consolidating its routes and fleet of planes. The simple acts of adjusting a depreciation calculation, extending the life of productive assets and elongating product release times, particularly by a market goliath, may be a warning sign of far greater changing industry dynamics.

In the week following Intel’s announcement, their market price and the market price of competitor Advanced Micro Devices (AMD) changed less than one percent, suggesting that the market had been preparing for this news and the announcement provided affirmation. In fact, at the beginning of 2016, any pessimistic views of
the semi-conductor industry were attributed to slowing growth in the PC industry rather than to changes in accounting estimates (Passeri, 2016). Over the last five years, at least 11 other semi-conductor firms have made similar changes in their accounting estimates. Accounting Analytics advised that this move is likely a sign of slowing innovation in the industry; although the change was financially positive for Intel, it affirmed their 2015 suggestion that technology cadence would be slower (Murphy, 2016).

Intel’s CEO Responds

Some industry analysts question the future of Moore’s law in light of Intel’s slowing innovation, related downsizing, and changes in accounting assumptions. According to Murphy (2016), “Some equity analysts found the 10-K disclosure ‘disconcerting,’ said Craig Ellis of B. Riley & Co., but he wasn’t particularly worried. Intel ‘has some of the best disclosure’.”

CEO Brian Krzanich published an online editorial taking a firm view:

“Moore’s Law is fundamentally a law of economics, and Intel will confidently continue to harness its value. The law says that we can shrink transistor dimensions by roughly 50% at a roughly fixed cost, thus driving twice the transistors for the same cost (or the same number of transistors for half the cost). This concept has fueled the technology revolution all of us have lived through. Intel’s leadership in Moore’s Law has driven the products delivering massive computing power growth and increasingly better economics and pricing. In my 34 years in the semiconductor industry, I have witnessed the advertised death of Moore’s Law no less than four times. As we progress from 14 nanometer technology to 10 nanometer and plan for 7 nanometer and 5 nanometer and even beyond, our plans are proof that Moore’s Law is alive and well. Intel’s industry leadership of Moore’s Law remains intact, and you will see continued investment in capacity and R&D to ensure so.” (Krzanich, 2016)

Moore’s law was validated by Intel’s success over its first half century. Announcements about accounting estimates and the R&D pipeline continue to motivate debate about its future or demise.

Decisions based on shifts in the pace of innovation, like the production and accounting decisions made by Intel in this case often evoke much debate in the business community. Some analysts and stakeholders see such changes as inevitable, while others question whether the curtailing of product releases could have been forestalled for another decade or more with more aggressive and successful research efforts. Either way, decision- makers must keep their business acumen current as markets evolve, while considering the influence of both technological advances and accounting fundamentals on their business and careers. Most importantly, as this case suggests, management must choose a position and maintain an informed point of view about debatable matters.

Discussion Questions

1. Visit the following web site to learn more about Moore’s law: http://www.intel.com/content/www/us/en/silicon-innovations/moores-law-technology.html. What is Moore’s law and why is it relevant to technology companies and consumers?
2. Refer to the Accounting Standards Codification (ASC) and identify the section of the Codification that addresses changes in accounting estimates. Why does this accounting change qualify as a change in estimate and not a change in accounting principle? Be sure to reference the appropriate section of the ASC.
3. Identify the financial accounts and elements of Intel’s financial statements that would be affected by this change. Ignore tax effects for purposes of this question.
4. While operating income will increase by approximately 10 percent, why might some investors and analysts view this change as a negative signal about Intel’s business operations?

5. What auditing concerns might the change in accounting estimate related to machine depreciation hold for Intel’s independent public accountant?

6. There are arguments that Moore’s law will continue to hold at the current pace into the indefinite future, while others believe transistor innovation cycles will inevitably slow in coming decades. Which position do you support? What are the business implications inherent in Moore’s law related to the pace of innovation?

Further Reading


References
Accounting Standards Codification (ASC) 250-10-50-4, Accounting Changes and Error Corrections – Overall Disclosure (Change in Accounting Estimate).


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