Is a technical auditor a necessity?[1]

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All companies and institutions use technical devices and systems in their operations to varying degrees, depending on their size and level of development, including integrated and non-integrated ones. Leaders of established companies face a real dilemma: either:

1. Continue their investments to maintain their current businesses, as they are stable and profitable.
2. Penetrate new areas by investing in more technologies, putting their core businesses at risk due to:
   - Losing focus.
   - Being overtaken by startups.
3. Falling behind in keeping up with technological changes, which could force them out of the market altogether.

The latter two options require company leaders to make decisions to invest in emerging technologies and bear the risks involved, while the option of not adopting new technologies risks technical bankruptcy. This makes the need for a technical auditor to determine the extent of potential risks and estimate their costs, given the significant impacts of each option.

The science of auditing has evolved and now encompasses many disciplines beyond the capabilities of the auditor himself. Auditing has become the responsibility of an integrated team of specialists. As an internal and external auditor, a Sharia auditor, a forensic financial auditor, and today we suggest a technical or technological auditor.

The aforementioned auditors constitute the audit team. Auditing represents inspections to identify errors or shortcomings that led to a malfunction or deficiency in the work, while reviewing adds a dimension to the necessary processes to avoid potential risks. Technical bankruptcy risks are an existing risk; their importance has increased and crystallized in light of the acceleration of inventions and innovations, and the integration and significant development of technologies. This has obliged (traditional) auditors, financial evaluators, and all experts to consider providing early warning tools that reflect the risks and possibilities of not keeping pace with market changes, such as the risks of technical bankruptcy, and thus the possibility of exiting the market, similar to the risks of financial bankruptcy. Since technical risks and their predictions require specialized experts, it is necessary to address what we propose to audit the company's technical situation and review its position relative to its competitors in the market to avoid any potential risks that could lead to technical bankruptcy. A technology auditor is: **a person**

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or group of people who are experts in technology and its methods and have deep knowledge of development, design, and security standards with the latest algorithms. Their task is to review shortcomings and areas for improvement in the company's technical systems and applications.

The technical review process (technology review) aims to enable the auditor to express an opinion on the company's technical resources, in terms of their relative importance and their suitability to current or potential new technological developments that have a fundamental impact on the current and future conduct of its business, so that the review processes provide a true and fair picture of the company's technical status with adequacy and effectiveness.

Reviewing Technology Adoption Strategies

The technical auditor must review the company's adoption strategies, identify who is responsible for making the necessary decisions, and determine the decision-making criteria.

Adoption strategies can be either rapid or deliberate. One or a combination of both can be adopted, provided that this is supported by comprehensive information, market analysis, and customer needs forecasting to select viable products. The chosen strategies may vary depending on the timing and innovation space within the same field, and illustrative examples will be presented later.

Technologies are analyzed as integration processes to produce new products. This requires:

- Gathering information about the components and technologies to determine the characteristics of the space.
- Analyzing the growth and development of the space and adopting the appropriate strategy based on this.
- Building a robust database to develop and improve the adopted technical approach.

Strategy Selection

The complexity of a space is an important signal for guiding the adopted strategy. Before making a choice, it is necessary to measure the evolution of complexity in the chosen innovation space. This is done by analyzing the distribution of product sizes. If the complexity level is:

- Low and constant, this indicates that the space is still in its infancy, and an accelerated strategy should be chosen.
- High, the space is maturing, and a deliberate strategy is the best approach.

How can we capture the signal from the available data in the space?

This requires developing a taxonomy by sampling and dissecting competitors' products, such as process innovations or choosing a specific business model.

Start-ups follow this by transitioning:

- From an accelerated logic for products that meet the minimum viable threshold
- To a deliberate logic focused on more complex products after securing the necessary cash flow and funding, once the space begins to mature.

Implementing the Strategy

- If a rapid strategy is implemented, the goal will be to adopt elements that enable relatively simple products by launching products with a minimum viability. This approach is suited to simplicity and speed.
- If a deliberate strategy is implemented, the goal will be to maximize future innovation options and technologies.
- But can companies adopt both rapid and deliberate approaches at different stages of their operations?

The answer: Yes, it is possible. It is not an easy task. An example of this is:

1. Uber. The company entered the ride-sharing space three years after its founding in 2009 as a taxi operator. It chose its space wisely: the ride-sharing industry was immature, the product complexity was low, and the key components were easily accessible. The market entry strategy required speed with a ride-sharing app. The company then shifted to a deliberate strategy by participating in the development of autonomous driving technology, which entails a higher level of complexity. This approach requires a longer development period.
2. General Electric. It developed a program called FastWorks, which enables the construction and development of minimum-production products in rapid development cycles. The company has continued to apply its own deliberate approach. However, few companies have the scope of GE's capabilities, so caution is advised when pursuing such a strategy.

Capturing and Adapting to Shift Signals

The best strategy depends on two factors, timing and space, as we mentioned. This requires monitoring:

- The level of complexity of the innovation space and the resulting technologies.
- The intensity of competition over access to information to capture the necessary signals that prompt a strategy shift ahead of competitors, and before the risk of technical obsolescence or bankruptcy occurs.

<u>Therefore, a consistent increase in product complexity is a reliable signal for a strategy shift, indicating that the time has come for a technological change.</u>

An example of a strategic shift is:

- Facebook's decision to begin designing its own chips in April 2018. This decision came after its recent scandals related to the leakage of customer data and the pressure from Europe. The company built its own team specializing in developing and manufacturing chips and processors to join this prevailing trend in the technology

world, following the example of fellow companies seeking to meet their needs and reduce their dependence on chip manufacturers (such as Intel and Qualcomm).

- Apple's announcement in December 2020 that it would produce its own chips and processors for its autonomous car project, and that it was working with TSMC to develop self-driving chips, was evident in the type of jobs advertised on Facebook. This is an example of tracking competitors' news and identifying their trends to sense technological inflection points.

Accordingly, adhering to a deliberate approach may be difficult and risky, but it represents an advanced approach to problem-solving, guided by the right signals, and leads to more robust solutions in a more predictable manner.

To understand the importance of the role of the technical auditor, we present two case studies of global companies that experienced severe financial shocks due to technical and technological reasons.

The Case of "Timing Mistake" and HTC:

HTC CEO Davis Metress admitted that the company had stopped innovating. This led to a decline in its global mobile phone market share, which fell from third place with 11%, leaving it outside the top mobile phone companies. He attributed the reason to the company's cessation of innovation in the smartphone sector and its shift towards innovation in virtual reality (XR). He summarized this as a timing error (which we express as timing). The company increased its investment in R&D in the emerging virtual reality sector at the expense of smartphone R&D.

In short, HTC's pivot towards XR technology was premature, as was its focus on developing markets. It has begun to correct its vision by focusing on countries with large GDPs.

The Case of Misidentifying Tech Space and General Electric:

General Electric is a 126-year-old American conglomerate whose production ranges from jet engines, large power plants, renewable energy such as solar and wind, gas and coal turbines, nuclear power, fossil fuels, and electrical grids.

The company faced a setback in its accounting records in 2018, sparking a $22 billion investigation into the value of its energy division's goodwill. This led to a decline in its shares on the New York Stock Exchange, reaching their lowest level in more than nine years.

In 2015, the company acquired $10 billion in energy assets to boost its profits, but profits declined due to:

- Slowing demand for fossil fuel-fired power plants;
- Intense competition for energy services;
- Declining utilization of large power plants.

Failure to correctly interpret technological changes made the acquisition a mistake, leading the giant company to seek to restructure its global products and restructure its leadership through changes to its organizational structure. According to former CEO John Flannery, the company distributed its portfolio of jet engines, power plants, and renewable energy, and eliminated its healthcare and Baker Hughes units, which supply products and services for drilling and oil production to the oil and gas industry. Analysts speculated that this heralded the sale of other assets, such as coal, nuclear power plants, and power grids. General Electric's loss reached $22.8 billion, compared to a profit of $1.3 billion the previous year. The reason was its failure to anticipate the 18% decline in demand in the energy sector, which resulted in a 33% decline in revenue in a single quarter. This led credit agencies to downgrade the company's rating, increasing its debt costs and exacerbating its financial challenges.

The aforementioned case study demonstrates the interconnectedness of accounting results with the technological environment. A giant company with massive capital assets, which makes it difficult to flexibly change its production methods and product quality, increased its investments in the energy sector without being able to accurately read the technological variables surrounding its products. It appears to have failed to recognize the technological inflection point occurring in the global market. This led to a sharp decline in its revenues and a decline in profits. Due to the financial structure of its balance sheet, where a debt culture dominates most investors, the credit rating straw (which anticipates events) broke the back of this giant company. Its debt costs rose, forcing it into a recession that forced it to restructure its products by abandoning some of them and getting rid of some of its experts. This in itself was a significant loss, manifested in a $22 billion decline in its reputation. There are, of course, many examples of companies that failed to keep pace with technological developments, going technically bankrupt and exiting the market. Among these examples are: Nokia and Sony in the mobile phone manufacturing sector; Yahoo and Myspace in the search engine and social networking sector; Blockbuster in the video tape manufacturing and rental sector; Kodak in the digital imaging equipment sector, etc.

In addition to the above, the numerous operating costs resulting from the implementation of these technologies, the most important of which is depreciation, a cost that has a significant impact on companies' operating results, especially in companies with a high concentration of fixed assets. Technical obsolescence is one of the three components of the depreciation rate; however, the cost of technical bankruptcy is a greater risk that must be considered and not overlooked.

Technical auditors have become a necessity for anyone who wants to maintain their market position.

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