Chapter 10
A Service-Based Measurement Model for Determining Disruptive Workforce Training Technology Value:
Return on Investment Calculations and Example

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ABSTRACT

Are the training outcomes of innovative technologies worth their investment cost? How can managers determine a company's valuable profits resulting from employing virtual, mixed, and augmented reality tools? This chapter presents metrics for evaluating information technologies' operations and business value relative to their service contributions in support of worker task efficacy and efficiency, reduced operations downtime due to training, and other benefits. The authors provide sample calculations that can help managers and researchers better explain the service-dominant logic-defined affordances of these innovative tools and their expected benefits in supporting corporate strategy, organizational performance measures, and operational performance in manufacturing knowledge production. Finally, the authors provide extended reality-supported worker training examples to model these calculations to determine the value of innovative technology assets for training and workplace performance improvements.

DOI: 10.4018/979-8-3693-3003-6.ch010

INTRODUCTION

Business firms invest significant funds in information technology assets to support yearly operational objectives and provide on-the-job tools for daily work or training. Training and education spending was $6 trillion in 2018 and is estimated to rise to $8 trillion by 2025 (HolonIQ, 2019). Business leaders make technology investments with tools like business analytics systems with an expectation of financial or other employee performance returns to the organization, such as training efficiency (Sharma et al., 2014); that is, a return on investment that financially benefits the company (Shin, 2006). Positive outcomes from information technology in academic research and real-world corporate settings are measured using observable learning or training performance improvements (Means et al., 2009). These improvements should then transfer from the employee to desired firm outcomes such as profit, efficiency gains, or another measurable advantage (Crossan & Apaydin, 2010; Park et al., 2018). Through this lens, workers acquire knowledge, skills, or other intelligence that are absorbed by and benefit the firm (Cohen & Levinthal, 1990; West & Bogers, 2014; Volberda et al., 2010). The evaluation of innovations should focus on the services technology provides rather than assuming tangible goods carry innate value (Vargo & Lusch, 2004; Vargo et al., 2008). Instead, the technology's consumer determines the service value a tool provides. That value results from a user's perception of the benefit they receive from technology-supported experiences. In addition, these services are delivered through digital devices (i.e., information technologies), providing an information-centric outcome (Glazer, 1991) that may be difficult to transfer to performance improvement. Technology-based experiences are often high in informational content, sometimes resulting in a high cognitive load that harms user performance.

The costs and potential training or work performance benefits from using information technology tools vary, as well as the expectations of a return on the investment in these assets. Return on investment (ROI) results from calculating profit after taxes divided by total assets (Oscan, 2017). Since training is commonly prepared for groups of workers by experts who define applied behavioral objectives, it is logical to determine earnings from investment in innovative training technology in terms of *training return on assets* (T-ROA). The traditional ROA calculation is *net income divided by average total assets* (Chopra & Meindl, 2014). Adapting this concept in innovative technology-based training contexts, we can calculate the T-ROA by *net income* (i.e., total measured training improvement or "profit") *divided by the average total cost of assets*.

Innovative technology implementations are commonly instantiated as a diverse, aggregate set of uses that employs a non-standardized mix of information technology tools. With exploratory uses of VR, for example, organizations may employ *Hololens, Oculus,* and one or more other technologies or variations of offerings from the same company. This way, companies can test the best fit for their needs and users. Different extended reality tools from vendors commonly serve the same training or use purposes but at different price points and levels of effectiveness in a particular setting. Therefore, it is important to calculate the average cost of all employed assets to determine whether one XR tool performs better than others so investment decisions can be made with a consistent technological selection that best supports worker training. The results of companies implementing various extended reality tools from vendors serving the same purpose but at different price points led to a lack of standardization and increased costs. However, these tools often significantly vary in usability and service affordances (i.e., digital benefits from use). This situation arises because newer, untested technologies are frequently purchased over time as financial resources are available for testing to determine if they meet the company's needs. Organizations then examine the different options to decide which tool provides the most substantial service