

# 8

## New Product Development: Implementing Agility through innovation and technology

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### Learning outcomes

By completing this chapter, the reader will be able to:

- Understand the relationship between operations management and new product development (NPD).
- Discuss the difference between goods and services amid growing service sectors.
- Understand the challenges to achieve sustainable competitive advantage through NPD.
- Explain how the concept of 'Agility' facilitates new product development success.
- Explain the benefits of integrating Agile framework with virtual and augmented technologies.

### Introduction

New product development is an integral part of the project management practice. However, product design and process design have been, historically, two of the main components of the operations management theory. Operations management is the task of creating value in the form of goods and services by transforming inputs into outputs. More specifically, the techniques to create value are universal in scope and can be applied to any form of enterprise whether service-oriented or manufacturing-based. It is this operations transformation model that creates the possibility for enterprise success. The efficient production of goods and services requires an effective application of the transformative process, and it is in this transformation that value is created. Value supports the possibility for enterprise viability, and without such, there is little opportunity for sustained financial feasibility – this is particularly so in the ever-increasing competitive landscape

of today's worldwide economic system. This chapter discusses the fundamentals of product and service development, in the context of sustainable competitive advantage, in the era of digital transformation.

*“The design and management of operations strongly influence how much material resources are consumed to manufacture goods or deliver a service, making sure that there is enough inventory to produce the quantities that need to be delivered to the customer, and ensuring that what is made is in fact what the customer wants”* (Sanders, 2017).

To create goods and services, organizations must be fully engaged in three essential, perhaps classical, functions. These functions are the necessary ingredients for continued financial viability; they are often at the heart of whether a corporation succeeds or fails – they are the manifest for organizational survival. Simply put, these functions are:

- 1 *Marketing*: which is the primary mechanism to generate the fundamental demand for products and services within the scope of the enterprise.
- 2 *Production/operations*: which is the mechanism to create products and/or services.
- 3 *Management / Administration*: those who not only have the vision for the enterprise, but also can organize, control, and plan as well possess the relentless focus needed to keep the financial underpinning at the forefront of daily decision making.

Although these three functions seldom create value on their own, they provisionally provide the groundwork for change. Change, along with a firm's ability to embrace new technologies, new process methodologies and new trends, enable future enterprise success.

## Differences between goods and services

From a functional perspective, operations which provide goods or services are very alike in nature. Essentially, both goods and services must have established quality standards, and both must be designed and processed according to planned logistics and scheduling, in facilities where human resources are employed. Goods are typically considered to be: *tangible consumable products, articles, or other commodities that can be purchased by consumers in exchange for money*. These are items which have physical determination and characteristics, i.e. shape, appearance, size, weight, etc. Further, goods provide an inherent capability to provide utility and satisfaction to the consumers of such.

Services are the *intangible* economic products provided by individuals or firms that can only be delivered at a moment in time, and are by their very nature *perishable*. As such, they lack physical identity and correspondingly, services cannot be distinguished from the service provider. Moreover, services cannot be **owned**, but rather, can only be **utilized**.

Some differences between goods and services are:

- Services, for the most part, are *intangible* and have the potential to vary significantly from one service provider to another.
- Services are often *produced and consumed simultaneously* and with that said, there is typically no stored inventory.
- Services are often *unique* and may vary, even when offered by the same service provider over time.
- Services typically have *high customer collaboration* with the service provider, often contributing significantly to the uniqueness of the service.
- Services are often *difficult to standardize* or *automate*, which typically means there is a significant labour content needed to provide these services.
- Services fundamentally make a profit by *optimizing the cost of labour*, since automation is largely impossible.
- Services are *inconsistent by definition*; providers of such have good days and bad days which potentially impact on the delivery of such.
- Services typically are highly *knowledge-based* on the part of the provider, and this knowledge is often proprietary in nature.
- Services are frequently *dispersed*, often with an existing client base.
- Services typically have *lower barriers to entry* meaning that startup costs are frequently much lower than manufactured goods. Given that these barriers to entry are that much lower, logically, the competition is the much greater.

## Growth of services

Services currently, in terms of contribution to the gross economic worldwide product, are on the increase – such cannot be said for manufacturing. Until the very early 1900s much of the economic sector was engaged in agriculture and related activities; manufacturing was merely in its infancy. With the introduction of technology and automation, manufacturing became increasingly important with respect to contributing to worldwide prosperity.

Manufacturing outpaced service sector growth until the early 1980s, with many claiming that the introduction of the personal computer gave new opportunities to service providers.

*“This is likely because of automation . . . with advanced tools such as robotics to handle tasks that were previously completed by employees, the average employee is able to produce more now than in years past. Thus, firms don’t need to hire as many workers to produce the same amount of output”* (Chien, 2017).

Advances in new technology also created many more options for the delivery of countless innovative services. Interestingly, manufacturing employment has decreased significantly worldwide with very few exceptions; however, workers are significantly more productive, largely because of the many new technologies that have been implemented throughout the production process.