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Teaching innovation to technologists (non-business people) and non-technologists (business people): Scotch Whisky as an exemplar of *process changing product* an alternative to traditional lectures



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ABSTRACT

Technologists and non-technologists have different perspectives that complicate their understanding of innovation. The taste and smell of Scotch Whisky is offered as a sensual experience (smell and/or taste) to assist people in gaining an understanding and appreciation of how process innovation leads to and is intertwined with product innovation for foods, chemical and engineered materials. The contribution of this paper is to demonstrate how to enhance learning and understanding about innovation through a straightforward exercise in experiential learning.

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1. Introduction

A unique challenge faced by educators working at the interface of management and technology is the lack of integration and difference in worldviews between managers and technologists. This paper takes one step to reduce this divide by offering an educational exercise integrating technology innovation and management in a way that managers and technologists both recognize the contribution of each perspective to the development of products and processes. This is achieved through an activity that demonstrates the interaction of product and process through experiential learning. The experience illustrates the importance of understanding the underlying technology to obtaining the desired product. This is important—as managers often incorrectly believe *with good management skills everything can be managed in the same way*. Such a confidence in general management skills can lead to

failed products and ventures (Walsh and Linton, 2011). Similarly technologists often feel that *technology is what really matters* and have trouble seeing the necessity of attention to the end customer's preferences and other business (non-technical) concerns (Caetano and Amaral, 2011; Malhotra, 2005; Taylor et al., 2005). While innovation scholars recognize the importance of both perspectives (Sokolov and Chulok, 2012; Brem and Voigt, 2009; Newbert et al., 2007), it is critical for technologists and managers to better understand each other's value proposition. Consequently, a case study/exercise is offered that relies on both perspective and skill set. The criticality of the mutual importance and interaction of technology and management cannot be understated. Otherwise, circumstances that are technology specific and technology intensive are likely to be dealt with as generic management examples. While teaching cases such as Chapparral Steel (Leonard-Barton and Preuss, 1991) are deeply indebted to excellence in management, there is a tendency to under-explore or overlook that it is excellence at the interface of technical and business management that allows an organization to achieve extreme success.

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Consequently, we consider the relationship of product and process innovation. Initially, *Abernathy and Utterback (1978)* demonstrated through a series of case studies how there is a tendency for design of assembled products to go through an era of ferment. During the era of ferment there is tremendous variation in product design; at some point a dominant design emerges. Once the dominant design is identified, product innovation quickly drops off as the accepted dominant design creates a reluctance to experiment with alternative designs. Consequently, the producers of the product change their focus to process innovations that offer a lower cost of production for the existing design.

Later *Barras (1986)* indicated that while process innovation intensity increases as product innovation intensity in goods declines (after the dominant design is established), the opposite is true for services. Barras points out how a wide range of IT-based services have all shown a tendency for intense process innovation to be the starting point. (IT is used to reduce labor through the development of programs to do tasks and calculations that people used to do directly.) Once experience is gained through the automation of existing processes, it is more apparent what new products could be offered by the information systems that are available. Consequently product innovation increases, but only after extensive experience is gained with process innovation. Typically as the opportunities for process innovation declines, personnel are redeployed to projects focused on product innovation.

Finally *Linton and Walsh (2003)*, note that certain types of products undergo process and product innovation simultaneously. They give examples of engineered materials, food, and industrial chemicals (*Linton and Walsh, 2008*). By creating an experiential exercise involving any of the three classes of innovations, it becomes much more memorable and easy to remember the difference between these three classes of products (good, service, and material) and more importantly to recognize that different sorts of technologies need to be managed in different ways and that these differences in management are not dependent on product, process or specific technology; but on classes of technology. So an individual or firm can use their skills directly between certain classes of product, but not other product classes (*Walsh and Linton, 2011*). As the interaction of process and product innovation pertain to food (and other types of materials) it is possible to provide a sensual exercise. *Somehow taste and smell are more memorable than the slides and lectures of many professors*—so an exercise involving a food product is used. Personal observation of technologists and managers suggests that Scotch Whisky is a material-based product that both groups are aware of and may even appreciate. It is an excellent exemplar as the ingredients are few and simple, but the tastes are wide ranging and this wide range is a direct function of the process.

Consequently, an activity is offered involving:

- (1) Either explaining the manufacturing process to the students, have them read the overview provided below, require the students to research the subject before the exercise, and/or have them watch a short film (examples, include: *Highgroveshop (2012)*, *Scotchmaltwhisky (2013)* and *Josh (2013)*).
- (2) Exercise in which participants identify the relative differences in various samples through either sense of smell or taste (see *Fig. 1*).

- (3) Participants rate samples in order of terms of their preferences.
 - (4) Participants rate the added value of the preferred products over the less preferred product in dollars. This results in a scale of the least favored sample having a value of zero and a record of the incremental value of all the preferred samples over the least preferred and each other.
 - (5) Discussion by students of the differences in the samples, their preferences, the difference in people's preferences and how this translates into differences in willingness to pay.
 - (6) Discussion of the types of taste or people that may put a preference on a specific Scotch and whether it is feasible to specifically target them—the example of Glen Ord's repositioning of their product for far eastern markets is given.
 - (7) Summarizing the takeaway messages:
 - Different types of technologies are managed differently
 - Product and Process Innovation occur simultaneously in materials related products
 - Process Innovation tends to follow product innovation for assembled products
 - Product Innovation tends to follow process innovation in services
 - A combination of technological and managerial skills is critical for maximizing profit with non-commodity products.
- Having given a summary of the steps in-class experience/exercise, the first stage is offered—the overview of manufacturing Scotch Whisky.

2. Overview of manufacturing Scotch Whisky

The manufacture of Scotch Whisky involves the use of three ingredients (yeast, barley, and water). The manufacture of whisky making also makes use of time and exposure to different temperatures to create a variety of different

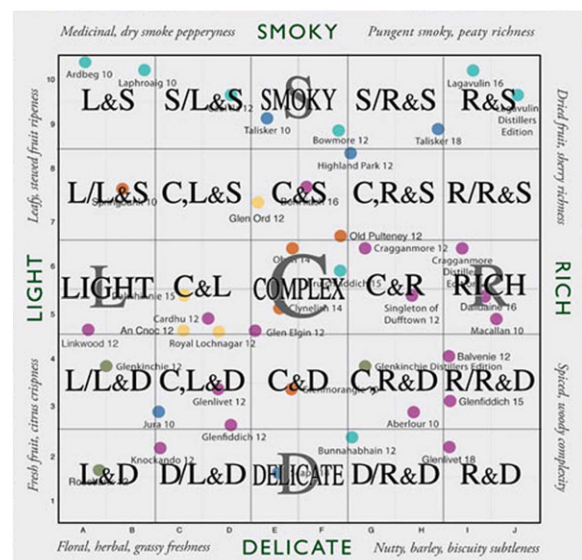


Fig. 1. Summary of how many different Scotch Whisky's compare to each other in terms of two critical variables: smokiness and richness (Source: <http://www.lfw.co.uk/acatalog/flavour-map-handout.pdf>).

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