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Drivers of pharmaceutical packaging innovation: A customer-supplier relationship case study

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ABSTRACT

This study explores the drivers of pharmaceutical packaging innovation. Demographic changes and rising healthcare costs pose challenges for the pharmaceutical industry. To meet these challenges, packaging innovation offers opportunities to provide patients with better solutions. Based on an in-depth case study of two companies—a global drug manufacturer and a packaging manufacturer—in a customer-supplier relationship, this study investigates five drivers of innovative packaging solutions: technology, legislation, marketing, logistics, and sustainability. This study identifies multiple stakeholders' needs regarding pharmaceutical packaging innovations. It also shows that robustness of packaging is prioritized despite a patient-centric approach. This study offers suggestions for further research. It also provides a benchmark to help future studies examine other contexts.

1. Introduction

Pharmaceutical packaging is a key facilitator for delivering patient-friendly medication. In patient-centered treatment approaches, packaging is crucial to enable business development and innovation to offer greater patient support within saturated healthcare systems (Crié & Chebat, 2013; Peláez et al., 2015). Demographic changes such as aging and the rise of the silver market are likely to increase the demands on pharmaceutical packaging and patient friendliness. Pharmaceutical packaging is therefore a valuable research area that is of considerable interest to the public and policymakers (Kohlbacher & Hersatt, 2011). For example, many medical product recommendations in Europe now cite the need for systems that are more patient-centered (WHO, 2013).

Yet most prior research has shown that packaging fails to respond to the problems and challenges that patients commonly face (Lorenzini & Hellström, 2017), including openability (Sormunen, Nevala, & Sipila, 2014; Yoxall et al., 2010) and medication adherence (Mackowiak et al., 1994; Schneider, Murphy, & Pedersen, 2008). For instance, studies have shown that many treatments are hampered by poor pharmaceutical packaging, resulting in complications that range from inconvenience to serious harm and even death (Ward, Buckle, & Clarkson, 2010). Scholars have also studied patients' coping strategies when managing treatment despite difficult packaging (Notenboom et al., 2014). According to the Healthcare Compliance Packaging Council (2015), frustrating experiences with medication packaging and the consequent

poor medication adherence are serious and costly consequences for patients and the healthcare system, causing rehospitalizations, disease progression, and other treatment complications.

So there is a mismatch between the expectations that pharmaceutical packaging should meet society's needs and the reality of pharmaceutical packaging. Part of the challenge derives from the nature of packaging innovation in the pharmaceutical sector, which is technology based and focuses on breakthrough drug discovery (Petrova, 2014). Long product development processes with high expenditures might limit resources for packaging development and innovation. However, this scenario is changing in practice and in research. Regulatory boards and global health organizations are aware of the future challenges in healthcare, and they seek responses from the industry to accelerate innovation toward patient-oriented alternatives (e.g., US Food and Drug Administration, 2016). Greater life expectancy and long-term chronic conditions have raised the demand for more efficient delivery of care systems, which is directly linked to development of packaging and medical devices (Stegemann, 2016). Moreover, the pharmaceutical sector can benefit from adopting a fresh look on innovation. By doing so, it can enhance collaboration and expand innovation efforts beyond drug discovery, according to an innovation survey of worldwide pharmaceutical executives (PWC, 2014). Finally, scholars themselves have called for business, marketing, and innovation research perspectives regarding packaging and patient care (Ford, Trott, & Simms, 2016; Sudbury-Riley, 2014).

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By considering innovation as a complex organizational process, this study explores the specific drivers of pharmaceutical packaging innovation. The literature on innovation and packaging is broad and multidisciplinary, but pharmaceutical packaging innovation is an underdeveloped niche. By identifying drivers, we can understand the primary forces that influence the decisions behind packaging innovation, which can be further analyzed in specific contexts. This study contributes through its exploratory nature and its focus on theory building and the development of theoretical propositions.

The remainder of this paper is organized as follows: [Section 2](#) reviews the literature and provides the theoretical framework for the study. [Section 3](#) presents the method and describes the research context and data collection. [Section 4](#) discusses the main results and presents propositions. [Section 5](#) presents the implications of the findings, limitations of the study, and suggestions for further research.

2. Theoretical framework

2.1. Innovation as a complex process

Innovation is a multifaceted concept that has been examined by extensive research. In this study, we focus on innovation as an organizational process. [Damanpour \(1991, p. 556\)](#) defines organizational innovation as “a new product or service, a new production process technology, a new structure or administrative system, or a new plan or program pertaining to organizational members.” This definition covers different types of innovation, across all parts of the organization, as well as the operation of innovation, which is subject to individual, organizational, and environmental influences.

[Slappendel \(1996\)](#) proposed three perspectives, which have evolved over time to reflect the gradual shift toward a more complex representation of organizational innovation in research. The first perspective is individualistic. Under this perspective, individuals are assumed to be self-directing agents and a major source of change within organizations. The second perspective is structuralist. Under this perspective, innovation is determined by organizational characteristics (company size, environment, formalization of activities, etc.). The third perspective is interactive. Under this perspective, innovation emerges from the interaction of structural influences and the action of individuals. The first two perspectives are simple and linear and illuminate particular causal factors. The third perspective captures the complexity and dynamic nature of the innovation process ([Slappendel, 1996](#)).

Research on innovation as a process is underdeveloped, unlike research on innovation outcomes. According to [Crossan and Apaydin \(2010\)](#), innovation as a process and as an outcome are both necessary facets of innovation, but innovation as an outcome is the endpoint of many scholars' intellectual quest. Unsurprisingly, there is greater interest in innovation as an outcome because it seems to be more tangible and easier to address by answering “what” questions such as “what is the magnitude of the innovation that has been generated (incremental vs. radical)?” Innovation as a process requires an in-depth understanding of the complex phenomenon prior to innovation outcomes and seeks to answer “how” questions such as “how is innovation driven?”

Our study focuses on innovation as a process. By theoretically depicting innovation as a complex organizational process, we deliberately focus on the elements that cause packaging innovation to happen, instead of examining what innovation can provide. Thus, the drivers of packaging innovation represent the key element of our theoretical framework.

2.2. Drivers of packaging innovation

Countless innovation drivers are discussed in the literature. These drivers range from internal factors to contextual factors ([Becheikh, Landry, & Amara, 2006](#)). A driver is a starting point to respond to a

crisis, an external threat, or the need to position the company in a new market ([Pablos, Turró, Tennyson, & Zhao, 2014](#)). An innovation driver motivates a company to leave its comfort zone and dedicate efforts to overcoming uncertainty and gaining a competitive advantage.

The evolved view of packaging is multifaceted ([Paine, 1981](#)). Scholars have expended efforts elaborating on the driving forces of packaging innovation. Initial studies lacked environmental or sustainable perspectives, which were incorporated in later studies. For example, [Coles and Beharrell \(1990\)](#) defined three primary drivers of packaging innovation: market, distribution, and technology. Ten years later, in a more complex trading scenario, [Sonneveld \(2000\)](#) proposed four driving trends of packaging innovation: business dynamics of the packaging industry (e.g., mergers and acquisitions, chain integration, and material developments), distribution (e.g., multinational retailers and market diversification), consumption (e.g., domestic sales and exports, demographics, and consumption habits), and legislative frameworks (e.g., environmental and health and safety). [Vernuccio, Cozzolino, and Michelini \(2010\)](#) listed three drivers of packaging innovation: marketing, logistics, and ethics. Ethics includes environmental and social aspects such as user-friendliness and corporate social responsibility.

Based on this literature, we define five primary drivers of packaging innovation: technology, legislation, market, logistics, and sustainability.

2.2.1. Technology-driven packaging innovation

Technology-driven innovation is highly relevant to R&D-based companies and is prominent in the literature (for a review, see [Garcia & Calantone, 2002](#)). Particularly in low- and medium-technology industries, technological development in packaging is essential for better product performance and differentiation ([Trott & Simms, 2017](#)). However, integrative perspectives also explore issues such as packaging technology for tracking and optimization throughout retail supply chains ([Regattieri, Santarelli, Gamberi, & Gamberini, 2014](#)) or safeguarding against counterfeiting ([Zadbuke, Shahi, Gulecha, Padalkar, & Thube, 2013](#)). Technology can be a sole driver of packaging innovation. But technology can be considered in conjunction with other drivers for more interesting discussions on the creation of new value propositions for the market, the supply chain, society, and so forth.

2.2.2. Legislation-driven packaging innovation

Legislation is a forceful driver of change. [Renning and Rammer \(2011\)](#) affirm that certain changes depend more on regulatory incentives than on market-pull or technology-push. Innovation is influenced by the stringency of the regulation (i.e., the degree to which regulatory requirements are strictly enforced). [Ashford, Ayers, and Stone \(1985\)](#) posit that non-stringent regulations might not require new technological solutions, and they tend not to achieve maximum protection. In contrast, stringent new regulations could force companies to change. Stringent legislation can be a major driving force of packaging innovation, especially in consumer packaging. The Food Additives Amendment (1958) and the Poison Prevention Packaging Act (1970) exemplify how regulatory evolution created bold institutions and an intense global debate about packaging ([Heckman, 2005](#)).

2.2.3. Market-driven packaging innovation

In contrast with technology-driven innovation ([Habtay, 2012](#)), market-driven innovation puts the customer's interests first ([Deshpandé, Farley, & Webster, 1993](#)). Inputs from the market provide the firm with insights and knowledge to develop and accept new products ([Johnson, 1998](#)). In the marketing literature, packaging is the “fifth P.” The other four “Ps” in the marketing mix are price, place, product, and promotion ([Nickels & Jolson, 1976](#)). At the point of sale, packaging works as a silent salesman ([Dichter, 1957; Pilditch, 1961](#)) to reinforce branding, boost sales ([Vazquez, Bruce, & Studd, 2003](#)), differentiate and identify distinctive consumer non-durables ([Underwood,](#)

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