Innovation and Product Positioning: When to Add or Replace

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Abstract

After introducing one product in the marketplace, we consider a firm that faces the investment decision of adding a new product in a monopoly versus a competitor who enters the market with a new product creating a duopoly. When facing this decision, the firm introducing the new product considers how to differentiate the new product from the old one by choosing the location, i.e., *horizontal differentiation*, the amount of R&D for the new product, i.e., *vertical differentiation*, the timing of the investment and the new prices. For the monopoly case, we find that with the increasing cost of the new product or increasing volatility of demand, there is a higher waiting period for investment, eventually leading to replacing the old product for high enough values of the cost or volatility. On the other hand, the profitability of the old product has a different effect, but still leads to replacement when the old product is very profitable. We also find that the investment region may not be just an interval, as is usually the case in stopping time problems. For lower values of the cost of the new product and profitability of the old product, the investment region separates into two intervals, leading to a hysteresis region.

Keywords: real options, linear city problem, horizontal differentiation, vertical differentiation, monopoly, duopoly

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