

Natural Experiments in Open Innovation Research

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Abstract

The natural experimental approach widely used in the social science field is a valuable scientific research tool to identify the causal effects of various social or economic phenomena. Even in innovation research, a natural experiment is an essential research method to verify the causes and effects of various innovations scientifically. The scientific approach in innovation research can provide great opportunities to identify which innovative strategies or pathways are more or less effective than other compared ones.

This paper discusses how a natural experimental approach can expand research horizons in open innovation (OI). Until now, most OI studies have neglected experimental approaches such as natural experiments. The experimental methodology provides analytical techniques to scientifically identify the real OI effects after controlling other confounding factors. Most OI studies so far have not been able to scientifically verify whether or how OI can generate the OI benefits compared with other non-OI factors. Substantial portion of the OI effect may come from the non-OI factors as confounding variables in the OI production function. Current OI research has neglected critical scientific methodologies to enhance the reliability and validity of OI impact estimation.

First, compared with various innovation studies in economics, administration science, and sociology, recent OI studies do not fully apply scientific methodological approaches for their research. Although many OI cases have recently emerged, they still lack scientific analyses to test various types of validity in causal mechanism and statistical consistency. Most of the studies have primarily relied on a single case or a small number of comparative cases. Although case studies can contribute to falsifying or refining current innovation research findings, it is still necessary to accumulate the case sample, which allows us to generalize the causal mechanism of the innovation impact. The natural experiment can provide numerous comparative cases with and without innovation activities (i.e., treatment effect) for statistical

inference.

Second, current OI studies have not adequately (quasi) experimental data to reveal the OI causal effect. In the future, it is necessary to identify the causal effects of OI through quasi-scientific experiments. The experimental research approach is still lacking. A quasi-experimental approach is essential to discern what some OI ideas are more compelling than others. However, without this experimental approach, a comparative analysis between the group affected by OI (i.e., treatment group) and the group not affected by OI (i.e., control group) is impossible. It is not easy to estimate the OI effect without forming a comparative group that is essential for determining the OI effect. A more specific comparison group could be the group affected by closed innovation (CI). For instance, some firms and consumers are affected by OI, while some other companies and consumers are affected by CI with OI. A quasi-experimental approach can provide an opportunity to differentiate and compare these two groups derived from OI and CI interventions, respectively.

Third, most OI activities usually involve a multilevel phenomenon from individual firms, institutional processes, and historical events. Open innovation research needs a multilevel approach to linking micro incentives and macro behaviors. Government policy reforms, institutional changes, and historical shocks in the innovation ecosystem involve massive OI effects on both firms and consumers and further generates new social trends. However, research questions about how to cover OI evolution from these differences have been lacking. A large sample derived from natural experiments can test a multilevel model that connects OI micro and macro levels. Natural experiments can provide various opportunities to connect the regional or social effects on the motivations of firms or consumers.

Based on the discussions above, natural experiments provide three critical insights to OI research. First, natural experiments can contribute to understanding in what historical and social environments OI promotes or inhibits OI innovation activities over time across societies. Second, natural experiments allow us to explore how various OIs intertwine with each other from the multilevel level perspective among individuals, organizations, and society. Third, natural experiments can create an experimental design to distinguish between treatment groups with OI activity and control groups without OI activity. The experimental setting produced by natural experiments allows a more scientific estimation of the OI causal effect.

Keywords: Open innovation, natural experiment, control group, causal mechanism, multilevel analysis

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