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Additional Information

Challenges and opportunities of new research methods in innovation, entrepreneurship, and knowledge

ABSTRACT

Research methods affect empirical results and shape theory construction. For years, social science scholars have applied multiple regression analysis (MRA) to analyze data and develop theories. Studies have pointed out the reasons for bad practice in MRA. Fuzzy-set qualitative comparative analysis (fsQCA) is an extension of qualitative comparative analysis (QCA) based on Boolean algebra and fuzzy-set theory. FsQCA identifies the combinations of causes leading to outcomes of interest and is suitable to reflect the complexities of many research problems. To handle multiple-layer problems (i.e., the outcome of a relationship becomes an antecedent of another outcome in another relationship), qualitative analysis with structural associations has been proposed to extend fsQCA. This special issue presents new research results by using or contrasting quantitative and qualitative research methods in the fields of innovation, entrepreneurship, and knowledge.

1. Introduction

Scientists' tools can shape theories (Gigerenzer, 1991), underscoring the importance of research methods in scientific research. March and Woodside (2005) showed that the understanding of consumer behavior within a marketing environment lies in the rigor of the methodology. Woodside (2016) attributes the low relevance or impact of many articles published in top journals in the social sciences to bad research practice. Good or bad research practice relates to research methods.

Multiple regression analysis (MRA) is a commonly used statistical method. It describes the correlations between dependent and independent variables. Woodside (2013) pointed out that MRA is more than just a tool; it shapes thinking and theory crafting. However, the use of one equation to model all data using MRA is a concern (Huang & Yu, 2019). In addition, the fit validation of using MRA is usually high even if random numbers are used as independent variables (Armstrong, 2012). Woodside (2017) has criticized theory construction and testing using MRA by arguing that when the number of cases is high enough, almost all relationships are statistically significant. Hubbard (2016) specified that the significant difference paradigm in MRA influences against the procurement of facts and theories built around those facts. Trafimow (2014) reported that the null hypothesis significance testing procedure is invalid. Finally, Ioannidis (2005) attributed the statement that most published research findings are false to the use of MRA.

Fuzzy-set qualitative comparative analysis (fsQCA) is an extension of qualitative comparative analysis based on Boolean algebra and fuzzy-set theory. Ragin (2008) contrasted the differences between fsQCA and MRA: set-theory versus correlation, calibration versus measurement, configurations of conditions versus independent variables, and causal complexity versus net effects. First, fsQCA uses set theory, based on the "AND," "OR," and "NOT" operators. MRA uses correlational connections, products of independent variables, and their corresponding coefficients. Second, fsQCA calibrates data on the range from 0.0 to 1.0, where 0.0 means full non-membership and 1.0 means full membership. MRA processes the data directly in most cases. Third, fsQCA provides combinations of variables to represent complexity to an outcome. MRA uses independent variables. Lastly, fsQCA provides analysis of causal complexity, while conventional methods offer analysis of net effects.

Based on the data, fsQCA generates causal complexity. Woodside (2014) indicated that complexity theory is appropriate for theory construction and data analysis. FsQCA has been applied to various domains. A study of the period 2005 to 2016 reveals that the number of applications of fsQCA has sharply increased over the past few years, with major fields relating to firm performance and innovation (Kraus, Ribeiro-Soriano, & Schüssler, 2018).

Rey-Martí, Ribeiro-Soriano, and Sánchez-García (2016) used fsQCA to analyze the causal complexities of job creation factors by 51 social enterprises. Huarng, Yu, and Rodríguez-García (2020) used fsQCA to conduct a time series analysis of Google trends data to forecast housing demand. Yu, Huang, and Huarng (2016) used fsQCA to identify two distinct groups of causal complexities of high economic development by energy consumption. One group, led by the USA, has high non-renewable energy consumption and generates high CO₂ emissions. The other group, consisting of Northern European countries, has low non-renewable energy consumption and generates low CO₂ emissions.

De Crescenzo, Ribeiro-Soriano, and Covin (2020) used fsQCA to analyze the causal complexity leading to successful crowdfunding, where four firm variables (firm age, sector, number of founders or CEOs, and founder or CEO gender) and two funding round variables (presence of rewards and number of pictures) were used. Among the sample, crowdfunding was found to be successful for start-ups with numerous founders and pictures in the pitch.

To handle multiple-layer problems (the outcome of a relationship becomes an antecedent of another outcome in another relationship), Huarng (2015) and Huarng (2016) advanced fsQCA and proposed qualitative analysis with structural associations. Using qualitative analysis with structural associations, Huarng and Yu (2019) explored the combination of factors affecting customer satisfaction and then repurchase intention in the online sharing economy. Phung, Ly, and Nguyen (2019) contrasted the empirical results of the above-mentioned method with those of structural equation modeling to examine the relationships between authenticity and brand equity.

This special issue presents new research results based on the use or contrast of quantitative and qualitative research methods, particularly fsQCA, in the fields of innovation, entrepreneurship, and knowledge. These papers are summarized to describe their new ideas, novel use of research methods, new findings in the research results, and new knowledge that contributes to existing knowledge.

2. Contributions

2.1. Hybrid methods

The integration of different methods helps solve complex problems. This special issue covers articles that integrate different research methods to solve research problems. Table 1 summarizes how different research methods can be used together to tackle complicated problems. Huarng and Yu use both fsQCA and qualitative analysis with structural associations to generate the relationships between surge pricing and customer retention. The study first uses fsQCA to generate candidate relationships between antecedents (loyal customers and surge pricing) and the outcome (satisfaction). The outcome (satisfaction) is then turned into the antecedent of the next layer. Finally, candidate relationships are generated for the next layer between the antecedent (satisfaction) and the outcome (customer retention). Consistency is used to select the generated relationships. The study then uses qualitative analysis with

structural associations to calculate the truth values (new consistency) for each selected relationship. This is a representative paper to integrate the use of both research methods.

Table 1
The integration of different research methods.

Authors	Methods
Huang and Yu	FsQCA to generate candidate relationships and consistency to select relationships Qualitative analysis with structural associations to calculate truth values (new consistency).
Picoto and Pinto	Multiple regression to explore moderator effects FsQCA to generate the relationships.
Barros, Matos, Sarmiento, and Vieira	OLS and logit models with random effects to calculate relevant variables FsQCA to add robustness to the quantitative approach
Fernandes, Curado, Oliveira and Muñoz	PLS-SEM to test hypotheses and to estimate specific indirect effects to verify mediation FsQCA to analyze causal relationships

Picoto and Pinto use multiple regression to explore moderators and then use fsQCA to generate relationships between the antecedent combinations and the outcome. First, the study uses multiple regression to identify the moderating role of cultural dimensions in the use of mobile banking. Then, the study uses fsQCA to find different configuration paths that lead to higher levels of mobile banking use.

Barros, Verga-Matos, Miranda-Sarmiento, and Rino-Vieira use econometric model (OLS and logit models with random effects) to calculate relevant variables. They then use fsQCA to add robustness to the quantitative approach. Their findings support the claim that activist campaigns are positively associated with the likelihood of a firm's decisions to pay dividends, even if it is at the cost of higher volatility on the dividend level and payout ratio.

Fernandes-Crespo, Curado, Oliveira, and Muñoz-Pascual analyze the contribution of intangible resources to building absorptive capacity to achieve innovation in micro enterprises. They use PLS-SEM to test the hypotheses and estimate mediation. They then use fsQCA to examine the causal relationships. The main findings are that knowledge sharing collection influences absorptive capacity. Knowledge sharing collection has a partial mediator role between entrepreneurial capital and absorptive capacity. Entrepreneurial capital, knowledge sharing collection, and absorptive capacity contribute to innovation. Knowledge sharing collection influences knowledge sharing donation.

2.2. Contrasts

It is always interesting to see empirical results from various research methods. Many studies compare empirical results from conventional statistical methods and fsQCA. This special issue also includes some such studies. Hernández-Perlines, Covin, and Ribeiro-Soriano compare the empirical results from two research methods: partial least squares structural equation modeling (PLS-SEM) and fsQCA. The results of the two methods are similar. The results indicate that (1) entrepreneurial orientation positively influences family firm performance; (2) socio-emotional wealth preservation positively influences both entrepreneurial orientation and family firm performance; and (3) socioemotional wealth positively moderates the influence of entrepreneurial orientation on family firm performance.

To identify the role of management accounting (MA) systems on global value strategies, Gonçalves and Gaio use different methods, such as multivariate regression, fsQCA, and factor analysis, to show differences in the empirical results. There are multiple interdependencies between MA intensity, the global market, and the value of the firm. The global market and MA intensity are directly associated with innovation. Multiple configurations also show the effect of value strategy in changing the nature of the MA system.

Wang, Thai, Ly, and Chi contrast qualitative analysis with structural associations and partial least squares (PLS) analysis. From the same set of data, PLS rejects the direct effect of self-verification on brand passions, as well as the mediation effect of self-verification. By contrast, qualitative analysis with structural associations suggests that all effects are significant and confirms the structural relationships of social endorsement from friends and the crowd with brand trust, self enhancement, and self-verification and the outcome of obsessive and harmonious brand passion.

2.3. FsQCA

This special issue presents some studies using fsQCA. Porfírio, Felício, Carrilho, and Jardim consider different stages of digital transformation, using multilevel analysis and applying fsQCA to analyze data on 47 Portuguese firms. They assess the patterns that may promote the most advanced stages of digital transformation. Felício, Samagaio, and Rodrigues use fsQCA to show how size, tenure, and budget compliance are associated with the degree of accomplishment of effectiveness, efficiency, quality, and global organizational objectives. Bernal-Jurado, Mozas-Moral, Fernández-Uclés, and Medina-Viruel use fsQCA to analyze online popularity as a development factor in the winegrowing sector. The empirical results reveal that the number of website visits is positively related to business integration, organic certification, export activity, website quality, and the marketing of bottled wine.

Krishen, Berezan, Agarwal, Raschke, and Kachroo use fsQCA to analyze the relationships among motivations for satisfaction derived from social media networking. They discuss the similarities and differences between social media users' motivations for satisfaction in these two cultures. By using qualitative analysis, Almenar-Llongo, Muñoz-de-Prat, and Orero-Blat analyze a group of international companies that have invested in Algeria in the form of a joint venture. They are thus able to outline the reasons that led these firms to invest and establish joint ventures in Algeria. They conclude that the 49/51 rule combined with increasing restrictions has affected two groups of companies differently. Yee, Miquel-Romero, and Cruz-Ros use fsQCA to reveal various configurations that suggest a new perspective to understand which quality-of-working-life factors exist when individuals experience well-being. Both realms help retain the workforce in the organization.

2.4. Other methods

This special issue also covers some papers using other research methods. Higuchi and Maehara use factor-cluster analysis to segment quinoa consumers into two groups: attitudinal and ethnical identity quinoa consumers and subjective norm and past experience quinoa consumers. They then use exploratory factor analysis with unweighted least squares and discriminant analysis to determine the factor importance and demographics. Medina-Molina, Rey-Moreno, and Periañez-Cristóbal, use multigroup analysis to establish the existence of differences in the relationship between brand attitude and purchase intention due to the existence of front-of-pack labeling in the case of the male sample.

Borges-Tiago, Tiago, and Rita use content analysis to assess the brand personality traits that are communicated and sentiment analysis to better understand the nature of content. Hotel profile descriptions on TripAdvisor convey a sincerer brand personality, while those on Booking.com convey a personality oriented to the scale of excitement. The study demonstrates the value of looking into electronic word-of-mouth as a source of brand meaning co-creation. Baran and Zarzycki use an array of methods to increase the accuracy of their research, including a longitudinal study, the comparison of expected versus actual perspectives and the comparison of mentored versus non-mentored individuals' perspectives. They examine the mentoring process in companies in Poland in terms of the benefits obtained by employees. Perez and Arias-Bolzmann use a qualitative approach and netnography method to analyze the Twitter conversation flow that supports the socio-cultural factors of minority subcultures. Their findings show recurrent subjects and sets of ideas related to sociocultural, human rights, economic news, critical reflection, and religious topics. Burström, Parida, Lahti, and Wincent use a qualitative method to study five large global manufacturing incumbent firms that are undergoing transformation with artificial intelligence (AI). They report on more than 30 semi-structured in-depth interviews with strategic key personnel in these firms to understand how they have successfully implemented AI and transformed their companies.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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