Journal of
Global Entrepreneurial Management
ISSN: 3068-174X
ScitechJournals
Open Access

Moving from Variance to Process Theory in Entrepreneurial Ecosystem Research: A Pragmatic Framework

Abstract

Entrepreneurial ecosystem research has gained momentum in recent years, sparking a conversation that aims at shedding light on the elements and mechanisms of (regional) entrepreneurship output. Most studies follow a variance-oriented conception of ecosystems, although entrepreneurship in general and entrepreneurial ecosystems in particular are concepts with process characteristics at their core. Process theory, the scientific approach to studying phenomena as a sequence of events unfolding over time, is still underdeveloped in the field. The paper argues that entrepreneurial ecosystem research benefits from a more robust application of process theory to understand and replicate complex ecosystem processes and streamline ecosystem theory development. The papers' implications are threefold. It (i) explains the theoretical perspectives that ecosystem researchers can apply when conducting studies, (ii) illustrates the necessity for entrepreneurial ecosystem literature to emphasize process theory, and (iii) provides methodological guidelines for the application of process theory.

Keywords: Process theory, Entrepreneurial ecosystems, Variance theory, Methods, Time

Research Article

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Received date: 19 November, 2024; **Accepted:** 24 December, 2024; **Published:** 31 December, 2024

Introduction

In the last decade, entrepreneurial ecosystems have become an intensely researched concept in the entrepreneurship literature [1-3]. Like most empirical studies in entrepreneurship (and social sciences in general), entrepreneurial ecosystem research employs mainly linear models that are variance-based and occur at a single point in time [4]. Scholars have recently argued for a process perspective on entrepreneurial ecosystems to better account for their complex dynamics and emergence over time [5,6]. While more and more ecosystem researchers focus on process phenomena, the scientific approaches to studying processes are still ill-defined or do not rigorously adhere to process theory characteristics. Furthermore, many ecosystem researchers neglect time as a research context and base their process explanations on variance theory, stressing cause-effect rather than sequential logic [7,8]. Why are time and processual thinking still largely absent from a field mainly dealing with emergence, development, and resource flow? How can we best capture dynamics within ecosystems? And how do we move from variance to process theory?

Scholars implicitly adopt different ontologies or worldviews when conducting ecosystem research. Those worldviews influence the questions being formulated, the methods employed, and the theory being developed [9]. Understanding those ontologies on which we design research and develop theory is useful for all ecosystem researchers, as this strengthens the theoretical basis, methodological diversity, and development of the field. A variance-

oriented worldview revolves around independent variables influencing dependent variables [10], often leading to linear cause-effect explanations. In contrast, a process worldview sees our world as becoming, in which change occurs over time, mostly displayed in a sequence of events [11]. While variance theory helps to build a robust descriptive view of entrepreneurial ecosystems, making them 'touchable,' process theory helps to uncover underlying mechanisms explaining how development happens over time, making them 'reproducible.' The first focuses on summarizing and describing characteristics of phenomena; the latter presents insights into mechanisms that explain how to build and develop entrepreneurial ecosystems over time. Indeed, the integration of time becomes fundamental in process studies, as processes can only be uncovered by making time the context of scientific investigations. Integrating time helps to understand entrepreneurial ecosystems horizontally from emergence at the beginning to entrepreneurship output at the end and vertically from the micro-level (e.g, entrepreneurs' practices) to the system level (e.g, culture dynamics).

When it comes to building theory, and much earlier, when it comes to 'doing science,' social science researchers are quickly trapped in a dispute over how we can know what happens-and more importantly-why it happens. In this paper, I provide an overview of those ontological and epistemological perspectives. My main objective is to develop methodological guidelines for applying process theory within entrepreneurial ecosystem research. In fact, conducting process studies is difficult without engaging with its underlying scientific approach. This is why the following section explains the fundamental characteristics of variance and process theory. Section three lays out the current status quo of process research in entrepreneurial ecosystem literature, while section four presents my guideline that holds methodological guidelines for conducting rigorous process studies. I finish the paper with a short conclusion stressing the pragmatism of my guideline and future process studies.

Theoretical perspectives in entrepreneurial ecosystem research

This paper reviews two theories: variance and process. Most organizational and entrepreneurship scholars agree that variance and process theory are the most dominant theories for the type of research conducted in the field [12-16]. I highlight that I focus on the type of research that ecosystem researchers apply, say their fundamental research design. I do not discuss theories in the sense of explanation models. Coming back to our example, entrepreneurial ecosystem theory and cluster theory are primarily used as explanation models to explain how and what economic output is created. However, in this paper, I discuss the upstream theoretical and methodological assumptions that define how researchers conduct studies to create explanatory theories. Therefore, type of research refers to a study's central scientific approach.

The fundamental difference between variance and process theory is that the first explains the phenomena under study with independent variables influencing dependent variables. In contrast, the second one explains how a sequence of events unfolds to create a specific outcome. The following explains variance and process theory and their relevance for entrepreneurial ecosystem studies.

Variance theory

[14] coined the term "variance" for the type of research that scholars apply when they follow a linear thought process and static worldview (Figure 1). Such a scientific perspective sees specific outcomes (dependent variables) as a result of a variation in independent variables. In short, a change in an independent variable determines a change in a dependent variable. This direct correlation builds on the premise that variables are precisely defined and distinguished from one another and that the characteristics of the relationship between the variables stay constant over time [16].

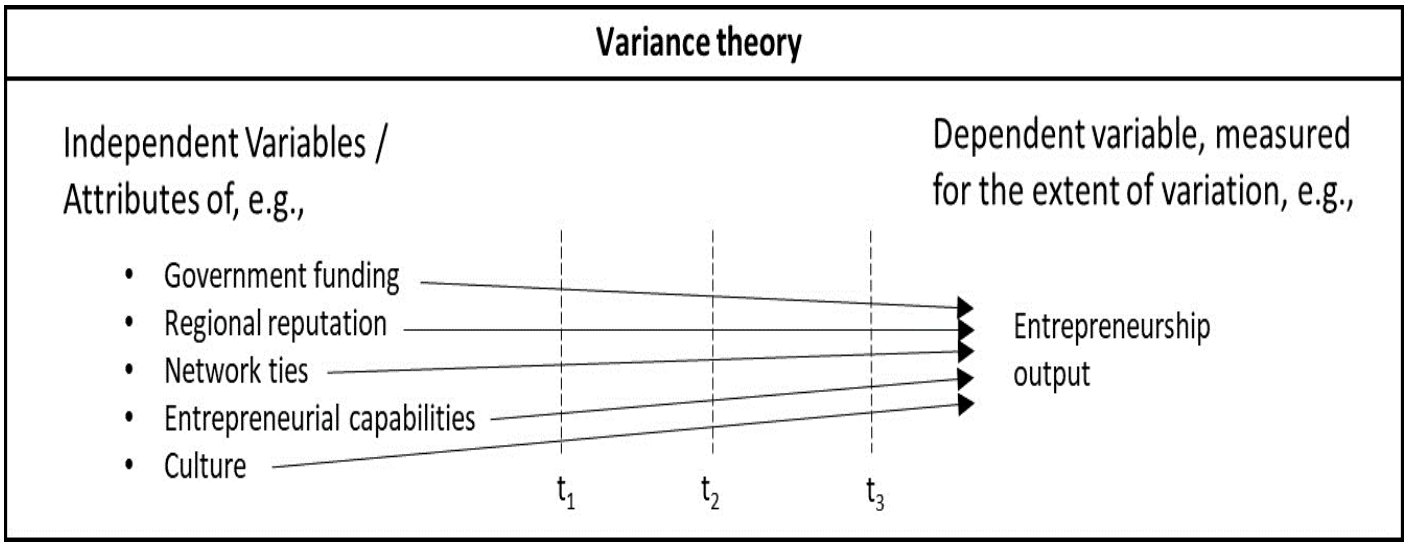

Figure 1. Type of research: variance theory [17]

Process theory

In contrast to variance theory, which explains what works, process theory explains how things work. Time becomes an integral part of process research in that scholars try to understand how things evolve over time, who is doing what at what point in time, and how specific events form into a coherent story (Figure 2-4). While variance theory explains relationships between variables (e.g, do more of X to get more of Z), process theory explains sequences of events (e.g, first do A, then do B, to get to C) [17]. While in variance theory, the research subjects are variables of entities (e.g, the ease of access to government funding), the research subjects in process theory are processes themselves (e.g, the resource exchange between an incubator and it incubate) or entities that do or are affected by events (e.g, an incubator's networking activities). Events are everything the research subjects (entities) do or what happens to them [16].

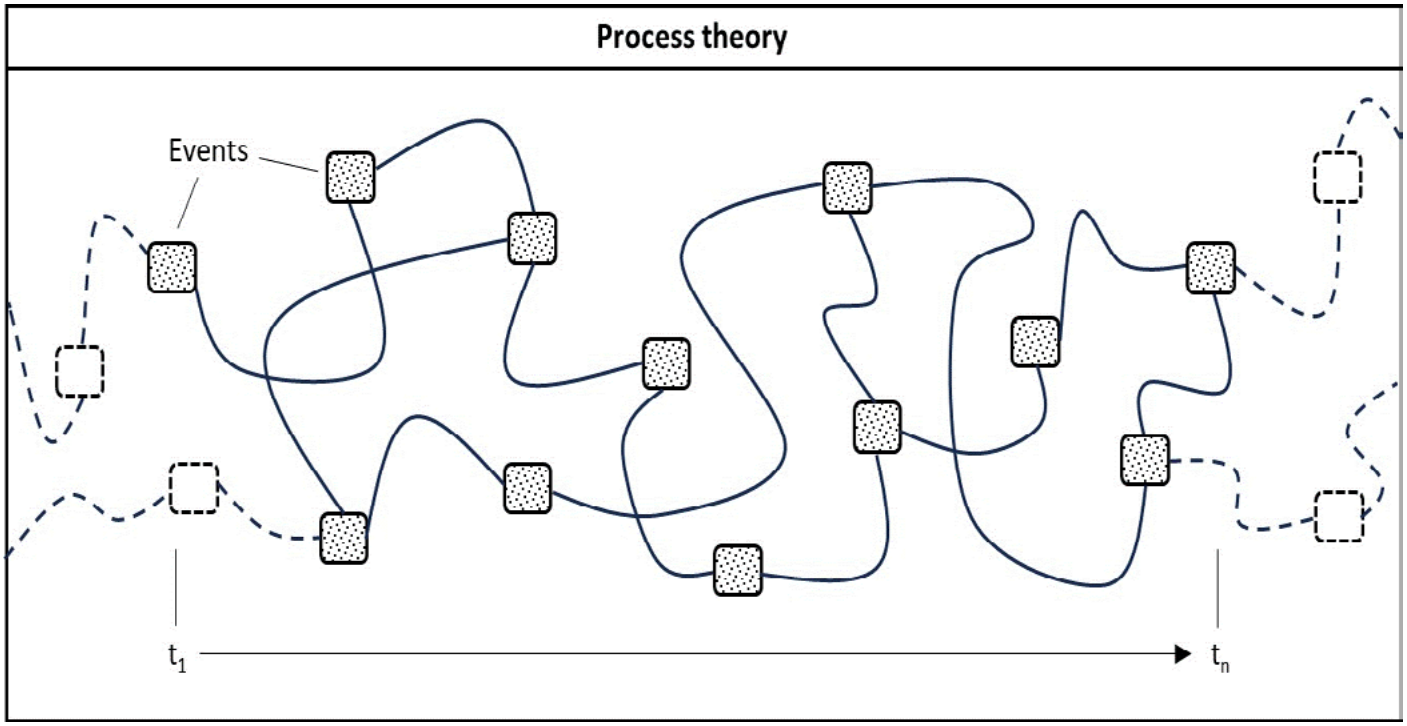

Figure 2. Type of research: process theory

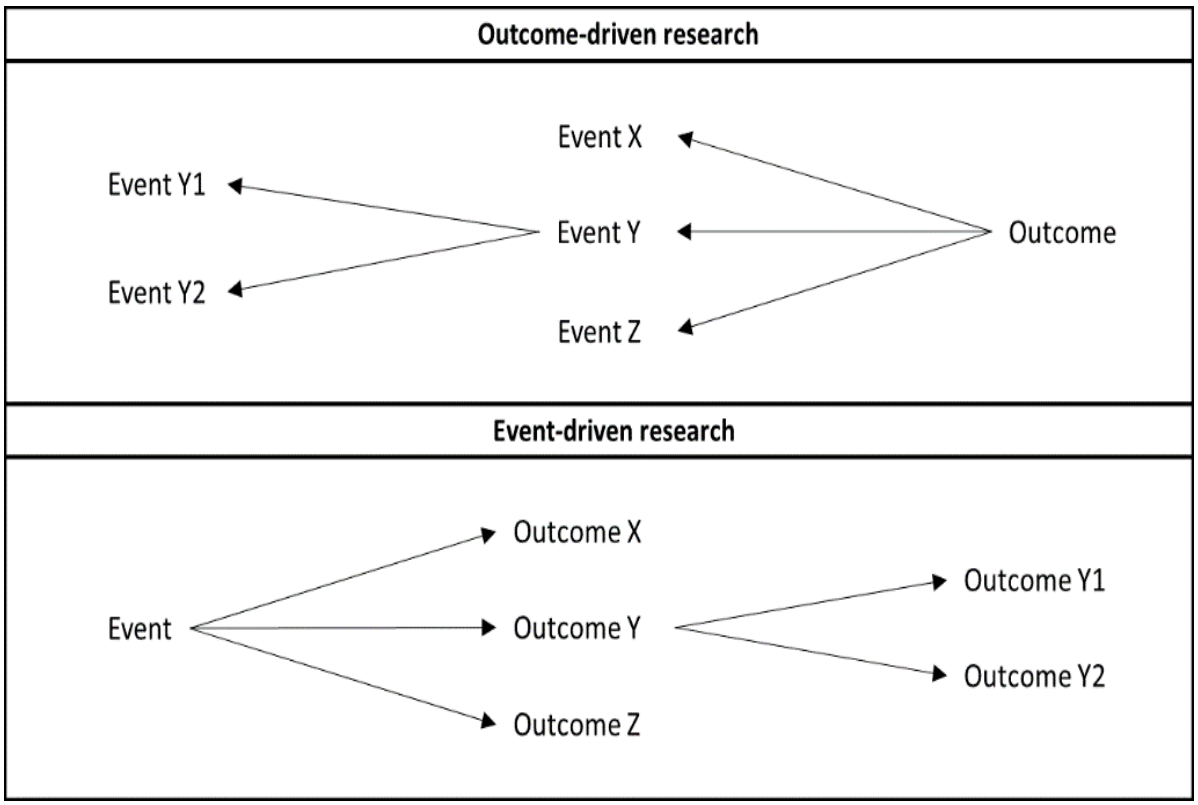

Figure 3. Ouctome- and event-driven research [12]

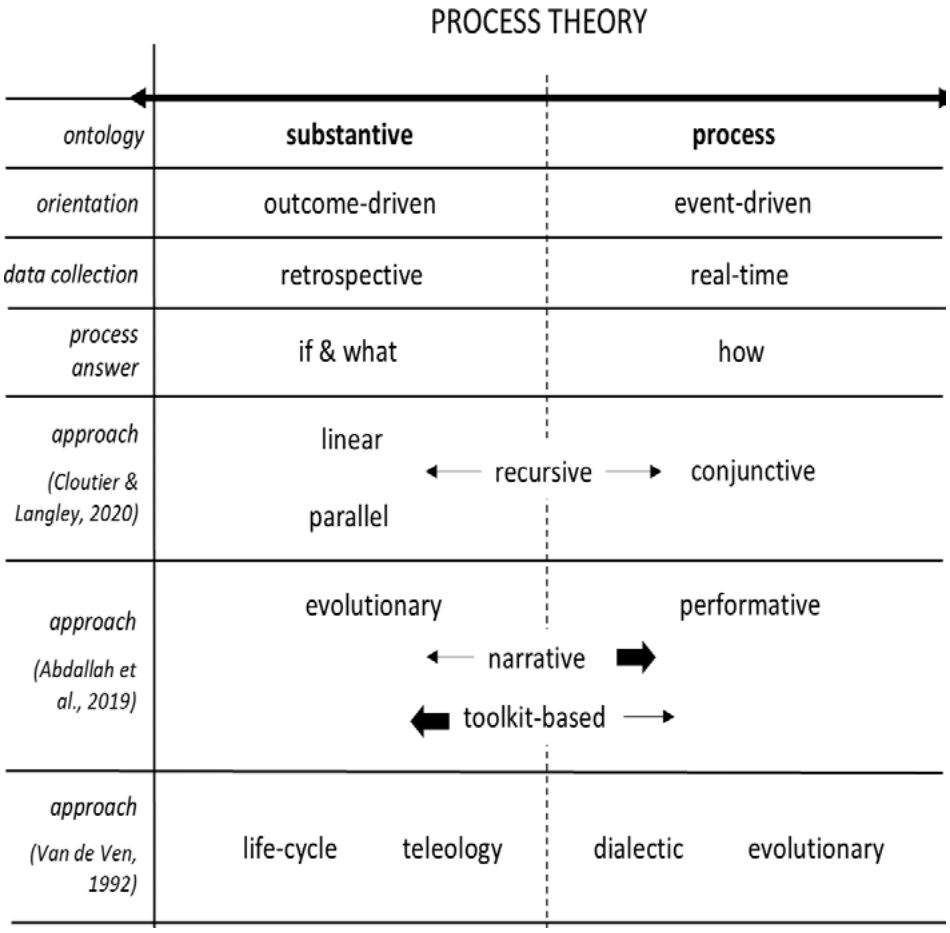

Figure 4. Process approaches

Where we are and where we are going

Entrepreneurial ecosystems have evolved as a theoretical lens to view regional competitiveness and economic growth as outputs of entrepreneurial activities that are supported and facilitated by a variety of stakeholders within spatial boundaries [18-21]. Triggered by the paper of [22], research communities from different fields got involved in the entrepreneurial ecosystem conversation, up to a point where scholars now opt for a reevaluation of the current literature to focus on theory development, as the entrepreneurial ecosystem concept might be used inflationary, leading to a fragmented and scattered field that hinders theory development [3]. For example, [2] conclude in a literature review that many scientific results are too simplistic and do not offer sufficient conditions to verify the identified results, therefore not explaining how ecosystems work and bearing the risk of giving wrongful policy implications.

In another literature review, [23] claim that one major issue within the entrepreneurial ecosystem field is the question of how to study entrepreneurial ecosystems. Indeed, many scholars support this point and argue that entrepreneurial ecosystems are by far researched from a static point instead of a dynamic, evolutionary, or process viewpoint [5,24-29]. Furthermore, the scholarly conversation often evolves around perspectives that are either too narrow (for example, incubators or universities as entrepreneurial ecosystems) or too broad (global entrepreneurial ecosystems under a digitalization view), leading to fragmentation and diffusion of the field, and hampering entrepreneurial ecosystem theory development [3].

The great majority of research has focused on variance-based studies (independent of the applied methods) that map and evaluate entrepreneurial ecosystems, their components, and outputs [2,30]. This provided a detailed picture of entrepreneurial ecosystems' structure, stakeholders, elements, strategies, and influencing factors. Nevertheless, the scholarly conversation is still under-theorized when it comes to explaining the emergence and dynamics of entrepreneurial ecosystems from a processual viewpoint [2,31-33]. Of the 25 most-cited entrepreneurial ecosystem papers published between 2011 and 2023 [34], only four papers can be considered process papers; two of them are purely conceptual: [35] and [5], the other two are qualitative: [36] and [37]. None of the two empirical papers is built on a process ontology.

Scanning the current ecosystem literature for process papers in high-ranked journals shows that focusing on processes in entrepreneurial ecosystems and adhering to a rigorous application of process theory are two different things. From the ecosystem papers that apply processual perspectives, such as studies that focus on evolutionary and developmental phenomena, only very few are built on a process ontology; most design their study and develop their theory on a substantive worldview. (Table 1) gives an overview of ecosystem process papers.

Year	Author(s)	Title	Journal	Method(s)	Ontology
2016	Mack, Elizabeth; Mayer, Heike	The evolutionary dynamics of entrepreneurial ecosystems	Urban Studies	Qualitative (Semi- structured interviews at two points in time)	Substantive
2017	Alvedalen, Janna; Boschma, Ron	A critical review of entrepreneurial ecosystems research: towards a future research agenda	European Planning Studies	Conceptual	Substantive
2017	Auerswald, Philip E.; Dani, Lokesh	The adaptive life cycle of entrepreneurial ecosystems: the biotechnology cluster	Small Business Economics	Mixed-method (descriptive analysis of ecosystem indicators)	Substantive
2018	Radinger-Peer, Verena; Sedlacek, Sabine; Goldstein, Harvey	The path-dependent evolution of the entrepreneurial ecosystem (EE) - dynamics and region-specific assets of the case of Vienna (Austria)	European Planning Studies	Qualitative (interviews at different points in time with different interviewees, questionnaire)	Substantive

2018	Roundy, Philip T.; Bradshaw, Mike; Brockman, Beverly K.	The emergence of entrepreneurial ecosystems: A complex adaptive systems approach	Journal of Business Research	Conceptual	Substantive
2018	Spigel, Ben; Harrison, Richard	Toward a process theory of entrepreneurial ecosystems	Strategic EntrepreneurshipJournal	Conceptual	Substantive
2018	Thompson, Tracy A.; Purdy, Jill M.; Ventresca, Marc J.	How entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle	Strategic Entrepreneurship Journal	Qualitative (interviews at more than one point in time)	Substantive
2019	Colombelli, Alessandra; Paolucci, Emilio; Ughetto, Elisa	Hierarchical and relational governance and the life cycle of entrepreneurial ecosystems	Small Business Economics	Mixed-method (single case study, questionnaires, structured interviews)	Substantive
2020	Donaldson, Colin	Culture in the entrepreneurial ecosystem: a conceptual framing	International Entrepreneurshipand Management Journal	Conceptual	Substantive
2020	Nair, Sujith; Gaim, Medhanie; Dimov, Dimo	Toward the Emergence of Entrepreneurial Opportunities: Organizing Early-Phase New Venture Creation Support Systems	Academy of Management Review	Conceptual	Process
	A.; Lehmann, Erik E.; Menter, Matthias				
2023	Khurana, Indu; Dutta, Dev K.	From place to space: the emergence and evolution of sustainable entrepreneurial ecosystems in smart cities	Small Business Economics	Qualitative (semi -structured interviews)	Substantive
2024	Rinkinen, Satu; Konsti-Laakso, Suvi; Lahikainen, Katja	University as an opportunity space enabler in a regional entrepreneurial ecosystem	European Planning StudiesCasper	Qualitative (expert interviews, group discussion, observations)	Substantiv / Process
2024	Casper, Steven; West, Joel	University Innovation and the Emergence of Four California Entrepreneurial Ecosystems	Academy of Management Perspectives	Qualitative (4 cases, historical data)	Substantive
2024	Donaldson, Colin; Newbery, Robert; Mirabent, Jasmina Berbegal; Kallmuenzer, Andreas	Decoding value exchange in entrepreneurial ecosystems through a service-dominant lens	Small Business Economics	Qualitative (visual network mapping, interviews at one point in time)	Substantive

Table 1. Process studies on entrepreneurial ecosystems

A pragmatic framework: Methodological guidelines

This paper is not the only one describing strategies and methodological guidelines for process research. Other scholars have created many reasonable, logical, and guiding assumptions that altogether give insights and structure when employing a process perspective [9,38-45]. However, as [46] state, none have "offered a unifying template or set of guidelines on how to do process research," which shows the complex nature of process studies and its challenges with handling multiple datasets, adhering to publishing norms and finding a coherent and convincing story. While I provide a synthesis of selected process research strategies and methods, I do not claim to provide such a unifying template; instead, I develop a pragmatic (and literature-specific) framework for conducting

process research. Furthermore, previous process scholars have emphasized analyzing existing process studies with a focus on strategies for analysis [46,39]. I developed a framework for designing and analyzing process studies that provides guidelines from the beginning (understanding of ontologies) to the end of a process study (new theory development).

I note that my methodological guidelines always have to be evaluated to assess their fit with the research question of the respective study and the researcher's own scientific ideals. Moreover, I see my guidelines as considerations, meaning they should be considered but not understood as the only way to conduct meaningful process research; they are offerings that are based on my understanding of the current status quo of process research and the entrepreneurial ecosystem literature and, as such, they should be evaluated and-if applied-tested against the individual research design and other determining factors. I structure my guidelines along my six-step framework for conducting process studies in the field of entrepreneurial ecosystems (Figure 5).

1 Set the direction
1A Choose a qualitative process approach
1B Engage with process studies in entrepreneurial ecosystem literature
1C Decide the zoom factor
2 Embrace ontologies
2A Apply an event-driven research design where possible. Embrace outcome-driven designs where necessary.
2B Make time your research companion
2C Focus on events and verbs rather than entities and variables
3 Familiarize with process approaches
3A Consider the story-character of resources
3B Find the approach-phenomena fit that creates a coherent story
4 Choose your methods creatively
4A Embrace the spectrum of qualitative research methods
4B Creatively combine methods to achieve higher accuracy
5 Analyze openly and iteratively
5A Seize the unknown
6 Theorize playfully

Figure 5. A pragmatic framework for designing and analyzing process studies

Conclusion

I was motivated to write this paper by the perception that the entrepreneurial ecosystem literature, while receiving strong interest, offered only partial insights into a processual understanding of its mechanisms. After further investigating this perception, I realized that only a few papers engaged in process theory, from which hardly any were built on a rigorous process approach. Although there have been multiple calls by ecosystem scholars to investigate and understand ecosystems more dynamically, an agreed understanding of how to do that rigorously is still missing. With this paper, I want to contribute to finding this shared understanding so that the conversation around ecosystems can be streamlined regarding what processes are, how we research them, and how we build theory from them. Process theory is needed as a significantly different type of research for building new theories and developing a complete picture of entrepreneurial ecosystems.

I named the paper moving from variance to process theory. However, it is not about leaving variance theory behind but about integrating process theory. Change and development are only perceptible next to static states and constancy. We can only appreciate ecosystems' temporal character if we understand their inputs, elements, interrelations, and outputs. Hence, we should find answers from variance and process theory and confidently move between both perspectives. I hope the developed framework and its guidelines inspire ecosystem researchers to investigate processes based on a process ontology.

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Citation: Felix, Toepler. “Moving from Variance to Process Theory in Entrepreneurial Ecosystem Research: A Pragmatic Framework.” J Glob Entrep Manage 2 (2024): 120. DOI: 10.59462/3068-174X.2.3.120