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The synthethic paradigm: pragmatism and design science as a unified framework for management research

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Abstract

This paper develops a unified framework for management research by integrating pragmatism and design science as complementary philosophical and methodological orientations. Its main objective is to address the long-standing rigor–relevance divide in management studies by showing how research can remain scientifically grounded while producing practically useful knowledge for organizations. Methodologically, the paper undertakes a conceptual and theoretical synthesis of major contributions in pragmatist philosophy and design science research. It traces the evolution of pragmatism through the works of Peirce, James, Dewey, and Mead, and connects these ideas to the development of design science in the writings of Simon, Hevner, van Aken, and Romme. The analysis highlights key methodological implications of this synthesis, including the role of abductive reasoning in generating novel solution concepts, the use of CIMO logic to formulate prescriptive propositions, and the relevance of Action Design Research for combining intervention, evaluation, and theory building.

The results of the study show that pragmatism provides the epistemological grounding needed for design science in management by shifting attention from representational truth to utility, problem solving, and contextual validity. In turn, design science offers pragmatism a rigorous pathway for producing field-tested and grounded technological rules that bridge theory and practice. The paper further argues that this synthesis enables management scholars to respond more effectively to contemporary organizational challenges such as innovation, digital transformation, and sustainability. The study concludes that a pragmatic design science approach can reposition management as a professional design discipline, capable of generating actionable, scientifically robust, and socially relevant knowledge. This integrated paradigm therefore offers a promising path for reconnecting academic research with managerial practice and for advancing more participatory, effective, and adaptive organizations.

Keywords: Pragmatism; Design Science; Management Research; Abductive Reasoning.

1. Introduction

The field of management science has been wrestling with the tension between the objective, rigorous requirements of natural sciences and the rich, subjective insights of humanities for a long time. This schism is considered by many distinguished academics to be a reason for a utilization problem or a relevance gap between science and practice, where research findings do not provide solutions to the practical needs of management practitioners operating in the so-called swamp of practice. The explanatory sciences focus on the scientific description and prediction of phenomena based on the perspective of the outsider and has thus resulted in organizational theory that does not allow for a prescription in managing the complex challenges of organizations (Aken, 2004). This challenge has prompted a new initiative that has proposed to reorient the entire management discipline around design science research (Van Aken, 2005). Design science research essentially seeks to answer the question "how things should be" by creating constructs, models, methods and instantiations. It does so to solve field problems and to turn existing situations into preferred ones (van Aken & Romme, 2012). But for design science to be accepted within academia, it should have an underlying philosophical perspective beyond positivism and interpretivism (Johnson & Onwuegbuzie, 2004). It is pragmatism that provides the grounding for design science research because of its focus on utility rather than absolute, representational truth (van Aken & Romme, 2012).

In terms of epistemology, Pragmatism presents a "third way," suggesting that knowledge acts not as reflection, but as a tool to cope with the flux and contingency of the world (Antoft & Salomonsen, 2007). This paper looks at the strong theoretical and methodological connections between pragmatism and design science in management. First, the paper looks at pragmatism history, starting from Peirce's to the instrumentalism of John Dewey and the social transactionalism of George Herbert Mead (Elkjaer & Simpson, 2011). Next, the paper traces the emergence of design science starting with the sciences of the artificial of Simon (Simon, 2019) to the work of Hevner (Hevner et al., 2004) and van Aken (Aken, 2004)) in IS and organization science. The other part presents a detailed elaboration on the methodological contributions that follow from the presented synthesis, among which the abductive approach (Mitchell & Education, 2018), the CIMO-logic for building propositions, and action and design in Action Design Research (Denyer et al., 2008). Finally, in the report we discuss the challenges of the double burden of having to contribute both to the situation at hand and to the generic body of academic knowledge and present how, the pragmatic design science approach offers the main path to the reunification of theory and practice in the management discipline (Meijer, 2025).

2. Literature review

2.1. Pragmatism as an Epistemic Paradigm

Taking a pragmatic approach to management research first requires a deep reflection on the nature of what we consider to be true knowledge. For the positivist, knowledge is found in an objective reality external to us, and this reality is governed by general laws. In contrast, for the interpretivist, reality is subjective and socially constructed, therefore knowledge can only come from understanding the subjective experience of actors within a situation (Lim, 2023). Instead of engaging with such philosophical debates on ontology and epistemology, pragmatism is primarily concerned with "the consequences character of the ideas of theories of knowledge" (Kaushik & Walsh, 2019). So, the focus shifts from whether a theory "matches" reality, to whether this theory is useful for answering the question, solving the problem or reaching the goal (van Aken & Romme, 2012).

2.2. The Philosophical Basis of Pragmatism

A history of this orientation dates back to the late 1800s when it was introduced by the classical pragmatists. The pragmatists, who Charles Sanders Peirce, the most acknowledged founder, established the "pragmatic maxims" and declared that the meaning of a thing consists in the sum of the practical effects it has or would have if considered. The main focus of design inquiry and reasoning is the transition from antecedent causes to the future effects of action (Elkjaer & Simpson, 2011). Peirce's major contribution to the logic of science was the introduction of abduction, or "inference to the best explanation" (Burks, 1946). Deduction is a reasoning process of necessity, induction is a process of probability based on previous instances, whereas abduction is the only kind of reasoning process that proposes new ideas. It starts with an “astonishing discovery” or a puzzle that does not match our present theory, and from here the researcher starts to form a speculation about a hypothesis under which the observation would be normal (Kolko, 2010). Abduction in management design is the innovation vehicle to make researchers conceive novel artifacts to resolve wicked problems (You, 2025). William James went on to ground this concept in the psychological and experiential domain by suggesting that "truth" is what becomes of an idea as it goes through the process of being used. It is a normative concept in James’s work; what is true is that which proves itself to be good or has withstood the test of individual usage over time (Kaushik & Walsh, 2019). Consequently, it offers a basis for evaluating the work of design science research; something is not "true" per se but is "warrantedly assertable" because it is successful in a context. This view may be of particular value in management where researchers and practitioners are more interested in satisfactory relations to other parts of experience than in the development of universal laws of management (van Aken & Romme, 2012).

John Dewey advanced this framework, articulating the notion of “inquiry” as a lifelong social endeavor, with meanings emerging through interactions between people and between people and the world. Dewey believed that inquiry is a process of experimental thinking that can resolve an “unsettled” situation; and that this state of doubt is the source of all ideas. Ideas, as a consequence, are “tools” to play with in an effort to transform indeterminate situations. Dewey called this instrumentalism (Elkjaer & Simpson, 2011). This conception of the scholar as an active agent of change through the combination of creativity and action that resolves the problem of uncertainty is essentially the same as that of the modern design science researcher who designs artefacts to solve problems in the field (van Aken & Romme, 2012). In addition, the social aspect of pragmatism has been enriched by George Herbert Mead's attention to the social nature of meaning-making and to "habits," or dispositions toward acting. Mead claimed that organizational life consists of cycles of "gestures and responses" through which we make sense of each other's behavior and predict our own behavior. The process of inquiry is provoked in cases where the habitual way of doing things is not sufficient for a particular new setting and a process of reflection, which is transactional and leads to new ways of doing things or being organized, takes place (Elkjaer & Simpson, 2011). In other words, design science in management is not just concerned with technical artifacts but with social and organizational change (Khadija, 2025).

2.3. Emergence of Design Science in Management

Simon, The Sciences of the Artificial, was important in establishing design science as an important research paradigm. He argued that many professional schools (e.g., business, management) had focused on natural sciences and had lost the ability to teach and conduct research on the essence of professional practice, i.e., design. He viewed design as an action or

a process which brings about a transition from an existing state to a preferred one. Simon believes that we have no science of design which has the same intellectual content as the natural sciences but which is as rigorous and hard. He emphasized the difference between the "natural" and "artificial": artificial things are characterized by function, goal, adaptation, and they constitute an interface between an inner system and an outer environment. Thus, the aim of design is to adapt the inner systems to the outer environment so that they can fulfill their task. In such a way, this framework recasts management as the science of designing effective interfaces, be they structures, processes, or systems, which enable a company to perform successfully in its external milieu (Simon, 2019).

Alan Hevner and team have made a real contribution by offering concrete conceptual underpinning and guidelines for design-science research within IS and thus actualize Simon's vision. According to Hevner et al. (2004), the research field of information systems is composed of two complementary research paradigms: the behavioral science paradigm, which attempts to build and validate theories that explain and predict human and organizational behavior, and the design science paradigm, which endeavors to create new and innovative ways to augment human capabilities. In other words, Hevner argues, the pragmatic approach to knowledge implies that knowledge consists of two facets, truth (or justified theory) and utility (or utility of artifacts). According to the pragmatic view, in the design-science paradigm knowledge is attained by building and applying the artifact. According to Hevner, knowledge types produced by researchers through DSR fall into four different artifact types: constructs, terms or symbols that facilitate problem-solving; models, depictions of relations between constructs; methods, algorithms and practices that can be applied to the problem-solving activity; and instantiations, fully implemented prototypes. In addition to the artifact types, he identified three different cycles: The Relevance Cycle, Requirements gathered from the organizational context, The Rigor Cycle, Requirements from the established knowledge base in the theory and practices, and The Design Cycle, the design iteration and evaluation cycle. This cycle of research activity, according to Hevner, is different from consulting and different from "routine design." DSR research, as defined by these three cycles, has the opportunity to return knowledge to the knowledge base of academic practice (Hevner, 2007).

2.4. Design Science in Management Theory

In the more general field of management and organization studies, Joan van Aken has focused on the question of the "utilization problem" of academic theory, rather than on that of information systems only. Van Aken has stated that management research becomes relevant to practice in complementing descriptive with prescriptive research, in the model of 'design sciences' (e.g. medicine, engineering), whose aim is to develop "field-tested and grounded technological rules"(Aken, 2004). A technological rule is a general knowledge statement which prescribes in a specific field of application, that action X leads to outcome Y in a specific context (Z). So, a technological rule is a statement in the form of "if you want to reach result Y in situation Z, then do action X" (Van Aken & Romme, 2009). However, Van Aken also stressed that for the rules to be scientific, they need to be 'field-tested' in a variety of situations to ensure that they are not 'ad hoc solutions to an ad hoc problem' but are instead 'general solution concepts to a class of problems' (Aken, 2004). And they also need to be 'grounded', i.e., we need to know why the intervention works, 'based on generative mechanisms from which that outcome can be derived (and which can be tested and falsified)' (van Aken & Romme, 2012).

Van Aken (2004) argued that grounding in 'the explanatory social sciences' may generate a 'virtuous cycle' between organization theory and management theory. Van Aken also

differentiated between a 'problem-solving cycle' that is aimed at 'addressing a specific business problem' and a 'reflective cycle' in which the generalizable technological rules are generated from the 'evaluation of interventions' (Keskin & Romme, 2020). Romme (2003) expands the definition of “organization as design,” advocating for a broader approach in which design serves as the research mode parallel with science and the humanities. He defines the design mode as being “driven by ideals and broader purposes” with synthetic thinking being an integral component when designing something that does not yet exist. Research based on design, therefore, creates “design propositions” tested in pragmatic experiments and rooted in the organization sciences, while the pragmatic dimension of the design mode provides a “common ground for the explanatory goal of science and reflective goal of the humanities” (Romme, 2003).

3. Methodological Frameworks and Abductive Reasoning

The confluence of pragmatism and design science has yielded advanced tools for carrying out investigations that satisfy academic and business audiences alike. One tool that is used is a logical framework, called the CIMO-logic, that provides a structure to create prescriptive knowledge: It consists of bringing together a problematic Context (C), which has a corresponding Intervention (I), to produce the proposed Outcome (O) via identified, or assumed, Generative Mechanisms (M) (Denyer et al., 2008). The CIMO-logic can also facilitate the process of a “design-oriented research synthesis,” in which multiple elements of the existing published literature are brought together to establish useful knowledge for managers (Van Aken & Romme, 2009). The emphasis here is on elucidating the "how and why" of mechanisms to help researchers understand the nature of causality behind the efficacy of an intervention in specific contexts but not others (Denyer et al., 2008). A further key development is the method called Action Design Research (ADR), which attempts to address a common "technological view" of artefacts that often fails to acknowledge how they are shaped by the organization.

In ADR, artefacts are conceptualized as emerging from constant interaction with the organizational context, even when this process is directed by the researcher’s intentions. The distinctive feature of ADR is its combination of building, intervention, and evaluation (BIE) iterations, which view an artefact as an entanglement of technical and social factors (Sein et al., 2011). Pragmatism is also central to ADR, emphasizing the value of knowledge gained by getting involved with organizational change, rather than remaining an “observer”(Khadija, 2025). Abductive reasoning’s role has been sharpened even more in recent management discussions, specifically in how it helps mediate "programmatic rigor" and "creative curiosity." In particular, "loosely coupled abduction" has been offered as a possible compromise between "uncoupled" creative insights and "tightly coupled" disciplined procedures. Such flexibility is especially vital in design science, where researchers often must work with messy, complex, moving phenomena that are not easily accommodated by a given, a priori framework. Abduction facilitates the formation of "speculative" interpretive schemes for unanticipated or unexpected empirical phenomena, schemes that are then subject to more rigorous, iterative design and evaluation in the future. Cautionary notes have been raised, though, with regard to "semiotic abduction," where practices may come to be taken for granted on the basis of repeated practice and tacit consensus instead of evidence (Wickert, 2025).

4. Applications and practical relevance

Pragmatism is taking hold in a number of innovative and new areas of management. In the field of entrepreneurship, the idea of the 'entrepreneur-as-scientist' frames entrepreneurs as pragmatic scientists, using abductive theorising to develop belief systems around value creation and testing those beliefs with experimentation in conditions of extreme uncertainty (i.e., under deep ignorance). This is centred on 'causally inferential action,' where entrepreneurs learn from the feedback, and pivot or iterate on the business model (Zellweger & Zenger, 2023). The use of design science for sustainability and corporate venturing aims to provide practitioners and managers with useful tools and guidelines on how to cope with the tensions of the innovation process (i.e., how to manage radical innovation in organisations with existing 'heritages') (Schmidt & Scheidgen, 2025). Design science is emerging in the public administration literature as a potential remedy to the growing number of 'wicked problems' in contemporary society that do not reside within any single disciplinary domain. The emphasis in this emerging literature is on 'the double burden' of design research, that is, to examine situational interventions while simultaneously developing generic knowledge for the research community, in the form of theoretical insight, design exemplars, and methodological guidance (Meijer, 2025). If public administration is treated as an artificial object, this enables researchers to propose design principles that may lead to the development of more humane, participative and effective public administration (Romme, 2003).

5. Challenges and implication

For one, design research is often seen as unscientific or just another form of “consulting” (Meijer, 2025). Today’s mainstream management research is still dominated by a deductive or inductive ideology which values initial theoretical underpinning and universal knowledge. To these gatekeepers the continuous, inquisitive, and empirical discovery of surprising phenomena in the pragmatic style of abduction is likely strange or even threatening (Miller et al., 2025). Moreover, a purely pragmatic emphasis on “what works” may leave unexamined the structures of power and the distribution of social capital that are intrinsic to organization life. After all, people in business do not always choose in order to maximize utility; decisions are also determined by interests and power. A pragmatist approach to business may not necessarily capture these dimensions of social action without the aid of additional sociological and political theories (Khadija, 2025). Addressing these limitations will require design science researchers to be more transparent in outlining their paradigmatic bases and methodical in describing the research process (e.g. the building of the artifact to address the issue and how the artifact will enhance the field’s “archival knowledge base”) (Meijer, 2025). Specifically, they can utilize focus groups to demonstrate how the research problem(s) is related to specific problem requirements to the developed artifact; they may also adopt systematic meta-models to document research processes (Henriques & O’Neill, 2021).

For the pragmatic design science synthesis to succeed, it must generate a “virtuous cycle”, in which organizational problems stimulate scholarly research, and this research contributes “practice-based knowledge” and guidance for solving these problems (van Aken & Romme, 2012). If scholars view management as a practice that is being designed, they can ensure the relevance of their work to practitioners, without compromising their research rigor (Van Aken, 2005). In order for the pragmatic design science synthesis to succeed, scholars must move past the “war game” of paradigm incommensurability and embrace a pluralistic approach, recognizing that diverse ontologies and epistemologies have value (Goldkuhl, 2012). In this post-postmodern world, where many different perspectives on reality exist, pragmatism

enables a researcher to synthesize surveys, case studies, action research, and the building of artifacts to tackle complex, multi-dimensional issues in the modern world (Khadija, 2025).

As the field of design science matures, it also appears to be influencing management education. In some business schools, design research is now starting to find a place in the curriculum, as future managers are thought to benefit from acquiring "design research competencies," such as abductive reasoning, evidence-based problem solving, and idealized design (Keskin & Romme, 2020). This is because managers are like design science researchers in their uncertain contexts in which they have to keep on testing and evaluating, and learning from what works and from what does not work (Meijer, 2025). Against the backdrop of such current organizational dilemmas as, for example, digital transformation and sustainability, the demand for prescriptive and applicable knowledge has increased to a great extent. Design science provides the kind of instructions that innovation processes need and enables multiple stakeholders to collaborate in visualizing the new and creating it. From building «persona templates» for user-centered design to developing «ecosystem model innovation» processes to designing «digital innovator tools», the pragmatic design science approach can help produce such practical knowledge that has a clear value for society and the scientific community (Aken, 2004).

6. Conclusion

Integrating pragmatism and design science into management research is a paradigm shift that addresses the discipline's enduring problem of credibility and relevance. It enables management science to reclaim its rightful position as a professional design discipline that aims to improve the human condition through the purposeful creation of organizational artifacts, in lieu of the “explanatory science” approach that attempts to study and understand phenomena from a detached standpoint and to discover universal laws that could be applied in the field (Aken, 2004). Pragmatism offers a “third way” that provides a “logic of inquiry” where the focus lies in utility, action and how to resolve doubts rather than the quest for accurate, representational truth (van Aken & Romme, 2012). The integration of Herbert Simon’s vision of the "artificial" (Simon, 2019) with the formalized frameworks of Hevner (Hevner, 2007; Hevner et al., 2004), Van Aken, and Romme(Van Aken & Romme, 2009; van Aken & Romme, 2012) has created a rigorous methodological pathway for producing knowledge that is both scientifically grounded and practically actionable. Through the use of abductive reasoning, management researchers can move beyond pattern-finding and hypothesis-testing to the creative synthesis of new solution concepts (Elkjaer & Simpson, 2011). Methodologies like Action Design Research and the CIMO-logic ensure that these concepts are not only effective but are understood through their generative mechanisms and organizational contexts (Denyer et al., 2008).

Nonetheless, the achievement of this paradigm rests with researchers being able to manage the “double burden” of the specific practical value as well as general academic information. It requires researchers to be transparent, traceable and evaluate their outputs (i.e., artifacts) to make sure they are contributing to the growing body of shared knowledge of the discipline (Meijer, 2025). They should also remain aware of their own power relations and social dynamics, which impact how organizational reality unfolds (Khadija, 2025). Finally, combining design science with pragmatism opens the possibility for reinventing future management study. It enables a virtuous cycle in which field problems stimulate academic research, while academic research results in tested, empirically grounded technological rules for how to improve the design and construction of more efficacious, participatory, sustainable organizations (van Aken & Romme, 2012). If we can succeed in combining both paradigms,

there will hopefully be a way to connect research and practice in the management domain and make the theories and artifacts of our discipline more relevant in the world (Van Aken, 2005).

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