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Systematic review of institutional innovation literature: towards a multi-level management model

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Abstract

Institutional innovation creates smart institutions that idiosyncratically thrive in a world of exponential change. Through policy-driven interventions and experiential learning, managers of institutions become adept at delivering praxis- and crisis-driven innovations required for survival and success. Similarly, the management of institutional innovation remains an interest in research due to links of this form of innovation to economic growth, and the demands of on-going major socioeconomic transformations due to technological advances, increased occurrences of major crises, and emerging socioeconomic challenges. Accordingly, a key question arising from the literature concerns the range of determinants and priorities that influence institutional innovation for delivering society value. Thus, the onus is on scholarship to capture and advance knowledge for harnessing the potency of institutional innovation. The purpose of this article is to analyse the current state of research on institutional innovation. Using the systematic review methodology, we identify and critically appraise 485 peer-reviewed scientific publications between 1969 and 2021. The review finds key determinants and management priorities with a view to developing a multi-level management model of institutional innovation. Guided by insights from the review, the article sets a research agenda for future management studies of institutional innovation.

Keywords Institutional innovation · Institutional change · Knowledge externalities · Economic conditions · Technology · Institutional theory

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1 Introduction

For institutions like governments and businesses, pressures to stay abreast with social changes and scientific advances in society, serve as the impetus for innovation,[1] i.e., institutional innovation, which changes not only global competition but also the basis of competition itself within, and between institutions. Existing viewpoints on institutional innovation expand management strategy and policy horizons for institutions to include processes such as supply chain management, product innovation, and customer relationship management. These viewpoints redefine roles and relationships across independent entities to accelerate and amplify learning and to reduce risks (Hagel and Brown 2013; Fuentelsaz et al. 2018; Gretchenko et al. 2018). The institutional innovation perspective also depends on mechanisms for building scalable, long-term trust-based relationships through learning capabilities (Hao and Yunlong 2014; Chittoor et al. 2015; Phornlaphatrachakorn 2019) and increasing awareness of environmental pressures (Chu et al. 2018; Tang et al. 2020a). Consequently, institutional innovation underpins the government, educational, training, and corporate policies that solve complex social problems, particularly through systematic collaborations between government agencies, universities, industries, and users.

In the management literature, the main problem for institutional innovation research remains questions on the legitimacy of institutions (Tingey and Webb 2020) and the necessary characteristics of novel initiatives that address socio-economic challenges such as income inequality (Biurrun 2020). Fittingly, there is on-going and increasing theoretical and empirical interest in the *determinants* of innovation (Molina-Morales and Mas-Verdu 2008; Li et al. 2020). For this line of inquiry, an important focus is on a working hypothesis that conformance to institutional frameworks underpinned by innovation has the potential to deliver societal value (Ventura et al. 2020; Chebrolu and Dutta 2021). Such frameworks highlight the dynamic nature of institutional environments, context-specific nature of innovations, and proactivity of innovators within institutions. Another area of interest (e.g. Pfister et al. (2021) and Tang et al. (2020b)), lies in understanding the *priorities* of institutions for managing the increasingly sophisticated policy toolbox used by governments to facilitate institutional innovation for public sector composition, creation of tax credits, investment in indigenous talent, intellectual property strategies, environmental protection regulations, funding for research and enterprise, etc. Here, the emphasis is on the nature of deep innovation and reviews of institutional structures needed to sustain livelihoods during times of historic change (Beunen and Kole 2021; Gongbuzeren et al. 2021; Hughes et al. 2021). In view of these on-going interests, there is a need to review and capture the current state of research

[1] Innovation is defined here according to the 2018 Oslo Manual as an *outcome* (business innovation), i.e. "new or improved product or business process (or combination thereof) that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm", and as a *process* (innovation activities), i.e. "developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm" (OECD/Eurostat 2018; p. 33).

on institutional innovation regularly for advancing domain knowledge and highlighting paths for future research.

The aim of this article is to review existing literature on institutional innovation based on a systematic approach. The review examines the trends of research methodologies and theories in studies, analyses key determinants, and synthesises management priorities for institutional innovation. Using knowledge captured from the review process, the article proposes a multi-level management model and sets a research agenda that challenges management researchers to advance the field of institutional innovation.

For this review, the interest lies in enriching the on-going work by researchers, managers, and policymakers to analyse the main determinants and priorities of institutional innovation. Such analysis remains critical for two reasons. *First*, innovation management studies that link institutional factors to economic growth contribute to a well-established domain of management research. This domain remains the focus of current studies (Jiang and Zhang 2020; Edwards and King 2021) to underscore the role of new ventures, market creation, inclusivity, and assistance afforded by institutions for the growth of economies and technological trajectory. Here, innovative activities within institutions act a central force to economic growth because they determine sharing rules within society and complement other growth explanations such as frugality, resilience, geography, trade, and capital (Gande et al. 2020; Tomizawa et al. 2020; Nkundabanyanga et al. 2020). *Second*, the world is at the brink of a major socioeconomic transformation due to the effects of technological revolutions like Industry 4.0, increased occurrences of major crises (e.g., natural disasters, health emergences, regional conflicts, terrorism, and economic recessions), and emerging challenges associated with climate change, rise of populism and geo-political tensions, environmental biodegradation, and rising inequality. Coping with this transformation remains complex and challenging. With thin mind, *this review intends to contribute to management research and discourse on institutional innovation* based on the rationale that a multi-level management model of institutional innovation could deepen and enhance understanding of determinants and priorities for supporting economic growth and confronting emerging challenges of major socioeconomic transformations. This review confronts the following research question:

RQ What are the main determinants and management priorities of institutional innovation in the literature?

The remainder of this review proceeds as follows. The next section gives an overview of institutional innovation, followed by the review methodology and findings on key determinant and management priorities, respectively. The review then presents the multi-level management model followed by a discussion of potential future questions and challenges for management research on institutional innovation.

2 Institutional innovation: an overview

Institutions are social constructs defined as "the rules of a society or of organisations that facilitate coordination among people by helping them form expectations which each person can reasonably hold in dealing with others" (Ruttan and Hayami 1984, p. 204). These rules govern behaviour, produce more long-standing facets of human systems, and steer societies along specific development paths (McCann 2004; Woodhill 2010) but depend on the will and creativity of individuals (Shaffer 1969). Through formal (e.g. laws) and informal (e.g. social norms) mechanisms, institutions concomitantly emerge from and determine socio-economic exchanges (North 1991; Scott 2006) within public and private spheres of human endeavour. In this context, some researchers argue that 'institutional void', i.e. the absence of formal institutional mechanisms, triggers the use of informal institutional mechanisms for guiding and supporting interactions (Raghubanshi et al. 2021). An alternate view argues that the emergence of institutions stems from constant-cause (same factors) and path-dependence (different factors) explanations (Parrado 2008). Recognising that institutions are 'rules of the game' (North 1990; Edquist 2006; Scott 2006), recent studies (e.g. Chebrolu and Dutta (2021) and Hughes et al. (2021)) argue that radical perturbations, such as the Coronavirus Disease 2019 (COVID-19) pandemic, are 'game changers' that cause socio-economic distress and disrupt the status quo. Yet, these perturbations also pose opportunities for innovation to reimagine existing institutions and to transform the supportive ecosystems of such institutions.

According to Hagel and Brown (2013, p. 4), institutional innovation is a shift from scalable efficiency to scalable learning, such that organisations "can become more adept at generating richer innovations at other levels, including products, services, business models, and management systems". Similarly, Raffaelli and Glynn (2015, p. 409) define institutional innovation as "novel, useful, and legitimate change that disrupts, to varying degrees, the cognitive, normative, or regulative mainstays of an organisational field". For Li et al. (2020b; p.115801), institutional innovation is "the creation of a new and more effective system to encourage people's behaviour, and the realisation of social sustainable development and innovation under the existing production and living environment". This form of innovation emerges from injections of investments and initiatives reinforced by policies and strategies as posited by the 'institutional-pump' model (Durugbo et al. 2020a), which contrasts with technology-push and market-pull theories on innovation (Martin 1994), as summarised by Fig. 1. For instance, 'pumps' of investment underscore directed actions that implement institutional changes proposed via contracts, internalisation, regulation, and referendums (Polopolus 1969; Hug 2005).

Using systems thinking, Johannessen (2008) attempts to explain changes due to institutional innovation along pattern, functional, historical, and cybernetic forms of causal processes. The author suggests these different processes account for legitimacy taken for granted (cognitive) or engrained in social pressures from institutional actors (normative). Similarly, Woodhill (2010) applies a systems

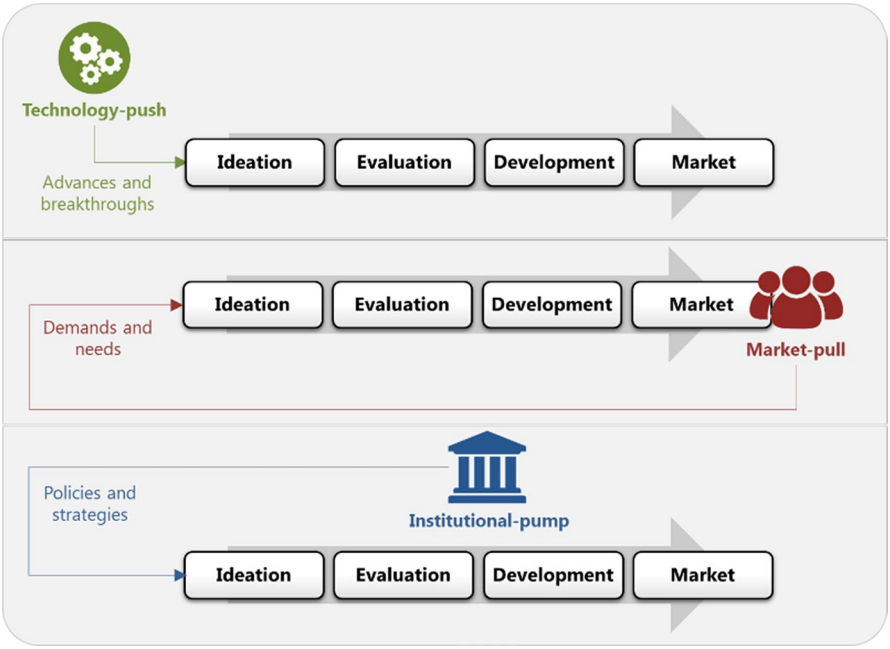

Fig. 1 Comparing the institutional-pump model to technology-push and market-pull theories of innovation (Durugbo et al. 2020a)

complexity standpoint to argue for institutional innovation capacity that involves navigating complexity; learning collaboratively; engaging politically; and being self-reflective. Irrespective of the characterisation, institutional innovation as a concept has some lawful implications for organisational actors. Like other innovations, institutional innovation concerns novelty and utility, but differs in that it is also "legitimate, credible and appropriate" (Raffaelli and Glynn 2015, p. 407). Institutional innovation rose to prominence due to development in sectors such as healthcare and manufacturing, with research on the subject gaining traction in the mid-1970s. Major management changes spurred by research undertaken in England and Wales in 1963 and 1973 as well as in France and North America account for most of this growing interest (Sewell et al. 2005). Here, insights provided from studies over the years underscore how institutions stimulate innovation to reduce uncertainties, coordinate the use of knowledge, mediate conflicts, and provide incentives.

Literature offers three main viewpoints on institutional innovation, as compared by Table 1. The first viewpoint, *induced* institutional innovation (Ruttan and Hayami 1984; Ruttan 1989, 2006), posits that resource imbalances due to institutional constraints motivates a dialectic interaction between demand for and supply of innovation. This interaction also considers the influence of technological and cultural changes in society. Here, innovators harness potential opportunities associated with overcoming institutional disequilibrium due to changes in market sizes, government rules, etc. (Grabowski 1991; Godden 1991; Ruttan 2006). The next viewpoint,

Table 1 Models of institutional innovation in literature

Models	Overview	Focus for innovation	Main institutional trigger	Sources
Induced institutional innovation	Proposes that institutional innovation and creativity stem from resource imbalances and influences from technological and cultural changes	'Demand and supply' management strategy	Agents of change	Davis and North (1970); Farrell and Runge (1983); Ruttan and Hayami (1984); Mandal (1987); Grabowski (1988, 1991); Ruttan (1989, 2006); Godden (1991); Lin (1995); Escobal (2000); McCann (2004); Phakathi et al. (2021)
Continuous institutional innovation	Posits that institutional improvements and modernisations serve to stay abreast with continuous technological advances and government changes	'As and when' management strategy	Scientific breakthrough	Sha et al. (2006); Tolbert et al. (2008); Biggs (2008); Fung (2012); Batukova et al. (2019); Li et al. (2020); Xie and Yang (2021)
Collective institutional innovation	Argues that institutional changes and reforms depend on different fields or sectors	'One and all' management strategy	Field-dependent exchanges	Hargrave and Van De Ven (2006); de Leeuw and Gössling (2016)

continuous institutional innovation, notes the rapid advances and waves in technological breakthroughs (Li et al. 2020; Xie and Yang 2021) that improve democratic governance (Biggs 2008; Fung 2012). These breakthroughs emerge from and deliver provisioning in four main forms: (i) technological infrastructure that *enact* innovative policies; (ii) high technology that *engineer* complex solutions; (iii) computer-based information systems that *enable* innovative business processes; and (iv) digital technologies that *enhance* service delivery (Durugbo et al. 2020a). The third viewpoint, *collective* institutional innovation (Hargrave and Van De Ven 2006), uses social movement and technology innovation literature to argue for a model of collective action for change that is field-dependent and occurs according to the exchanges between actors within the field. The viewpoint also highlights four perspectives on institutional innovation involving adaption, diffusion, design, and collection action—according to varying actor level foci and reproduction/ construction modes of change.

Institutional innovation is important for accelerating economic activities and contributes to added economic value. This is because this form of innovation shapes the behaviour of organisations (Edquist 2006) and motivates institutional actors to plan modifications that spur a variety of collective activities carefully (Schickler 2001;

Veiga et al. 2020). Institutions also favour innovation because the process gives rise to stability necessary for fluid knowledge exchanges and learning processes (Carlsson 1997). In discussions concerning the role of innovation for economic growth, recent research accentuates the need to explore selective forms of interventions that support internationalisation in spheres of education (Foray and Woerter 2021; Fumasoli and Rossi 2021), the public sector (Buchheim et al. 2020), and business (Hernández et al. 2021). Some key areas of interest for interventions include fostering innovative work behaviour (AlEssa and Durugbo 2021), and reducing barriers (Hueske and Guenther 2015). Using transformative policies, pro-innovation institutions also attempt to address inequality in economic systems (Biurrun 2020; Perry 2021), manage immigrant integration that boosts cultural diversity (Nyseth and Ventura López 2021), and confront the conflating challenges of energy development and environmental protection (Gao et al. 2020). Yet, institutional innovation is difficult and faces unease, disagreement, and conflict due to the dynamic nature and tension between institutional persistence and innovative change (Hargadon and Douglas 2001). Evidence also suggests that the application of innovation generates additional risks for some institutions (e.g. financial institutions) due to the peculiar complex nature of delivered services (Mishchenko et al. 2021). Furthermore, there are arguments that institutional innovation negatively creates "certain structural and distributional biases" against the backdrop of economic value for institutional actors and participants (Farrell and Runge 1983). Such biases threaten the legitimacy and question the efficacy of the innovation by institutions.

Although, related reviews adopt the systematic approach to review institutional change research (van der Heijden and Kuhlmann 2017; Bakir and Gunduz 2017), the work presented in this article is unique in its focus on institutional innovation. Motivated by the need to deepen knowledge on institutional innovation determinants and priorities, the review presented in this article, seeks to enrich the discourse on factors and actions required for managing institutional innovation and revising existing institutional structures.

3 Methodology

Motivated by *RQ*, this article applies the systematic review methodology (Khan et al. 2003) to analyse research studies on institutional innovation. The process for this review, shown in Fig. 2, consists of three main phases: planning, conducting, and reporting (Kitchenham and Charters 2007; Durugbo et al. 2020b). *Planning the review* involves creating an initial protocol that concretises and formalises the review plan. Table 2 outlines the review protocol concerning the context for the research, the specific research questions, the planned search strategy, and the criteria for publication selection.

Conducting the review is the phase entailing the selection of studies, quality assessment to include studies, data extraction and monitoring, and the data synthesis. Selection concentrates on sources available on two online databases. First, Scopus (https://www.scopus.com), which is a scientific search engine with

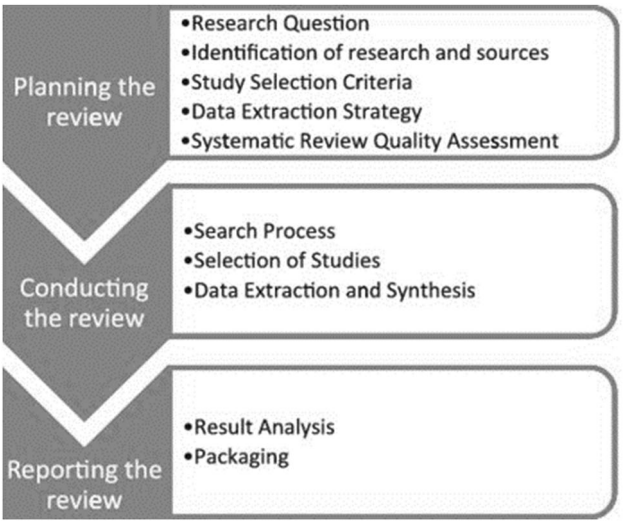

Fig. 2 Systematic literature review process (Kitchenham and Charters 2007)

Table 2 Systematic literature review protocol

Review elements	Descriptions	Foci in the review
Purpose	Aim of the literature review	To review existing literature on institutional innovation
Search strategy	Course of action or plan to inform the search process for the review	The search strategy for the review involves using keywords to search specified database and informed by screening and exclusion criteria
Search string	Joining of key words used to conduct the search for literature	*The research strings for the review are* "Institution AND innovation", "innovation AND institution", "institution innovation", OR "institutional innovation"
Database	Independent online database with citation data and indexes of scholarly writings	*The databases used for the review are* Scopus Web of Science
Screening and Inclusion criteria	Requirements for selecting and including review sources	*The searching criteria for the review are as follows* Empirical and theoretical peer-reviewed journal articles Limited to management studies Research on 'institutional innovation' concept and challenges
Exclusion criteria	Requirement for skipping publications during the review process	*The exclusion criteria for the review are as follows* Duplicates Conferences proceeding paper, master's thesis, doctoral dissertations, textbooks, unpublished working papers Articles that use the term 'institutional innovation' or 'institution innovation' beyond the scope of management

the most inclusive coverage of published peer-reviewed research. The database provides access to over 26,000 + scientific, technical, and medical (STM) journal titles from over 7000 + publishers. Second, Web of Science (www.webofscience.com), which is a citation database that tracks and provides access to over 171 million records with about 1.9 billion cited references. Using Scopus and Web of Science, the review identifies, screens, and accumulates sources related to institutional innovation. The search process for the review applies a range of search strings to identify and screen sources based on titles, keywords, and abstracts of articles. The specific strings that serve as the basis for this review are "institution AND innovation", "innovation AND institution", "institution innovation", and "institutional innovation". This search generated 1600 and 1515 results on Scopus and Web of Science respectively, and further refined searches limiting results to journal articles published in English produced 983 and 893 results on Scopus and Web of Science, respectively. Cross-referencing to identify duplicates and screening for relevance yielded *485 articles* published between 1969 and 2021 that serve as the basis for this review. Figure 3 shows the yearly distribution of the review articles, indicating a growing trend and interest in the topic, particularly in the past 7 years. The review relies on empirical and theoretical peer reviewed journal articles as the main inclusion criteria. Consequently, this process excludes conference proceeding papers, doctoral dissertations, master's theses, textbooks, and unpublished working papers.

For *reporting the review*, data analysis initially presents trends and classifications of studies. This phase derives data from preceding steps to inspect, clean, transform, and model review data on methodologies and theories within studies. Figure 4a shows that the main methodologies used in the literature are case studies (171 articles), econometric models based on longitudinal panel data (111 articles), surveys based mainly on cross-sectional data (52 articles), and essays

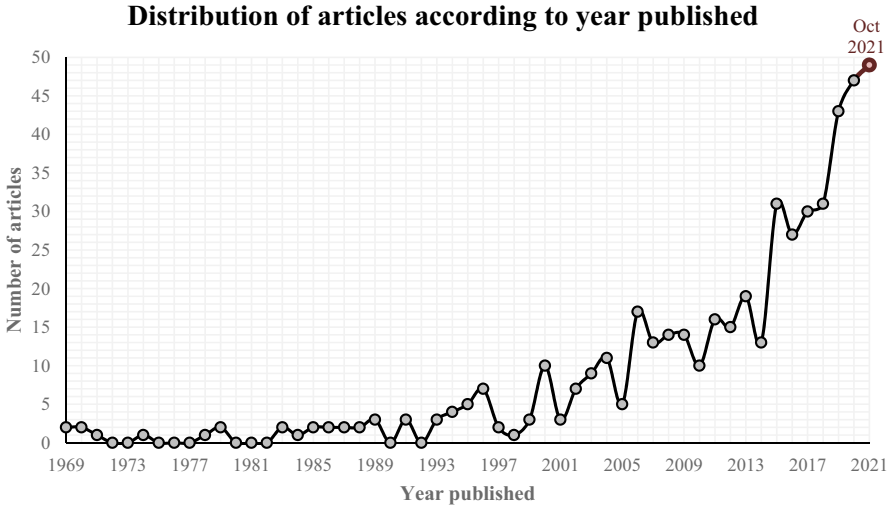

Fig. 3 Yearly distribution of institutional innovation publications

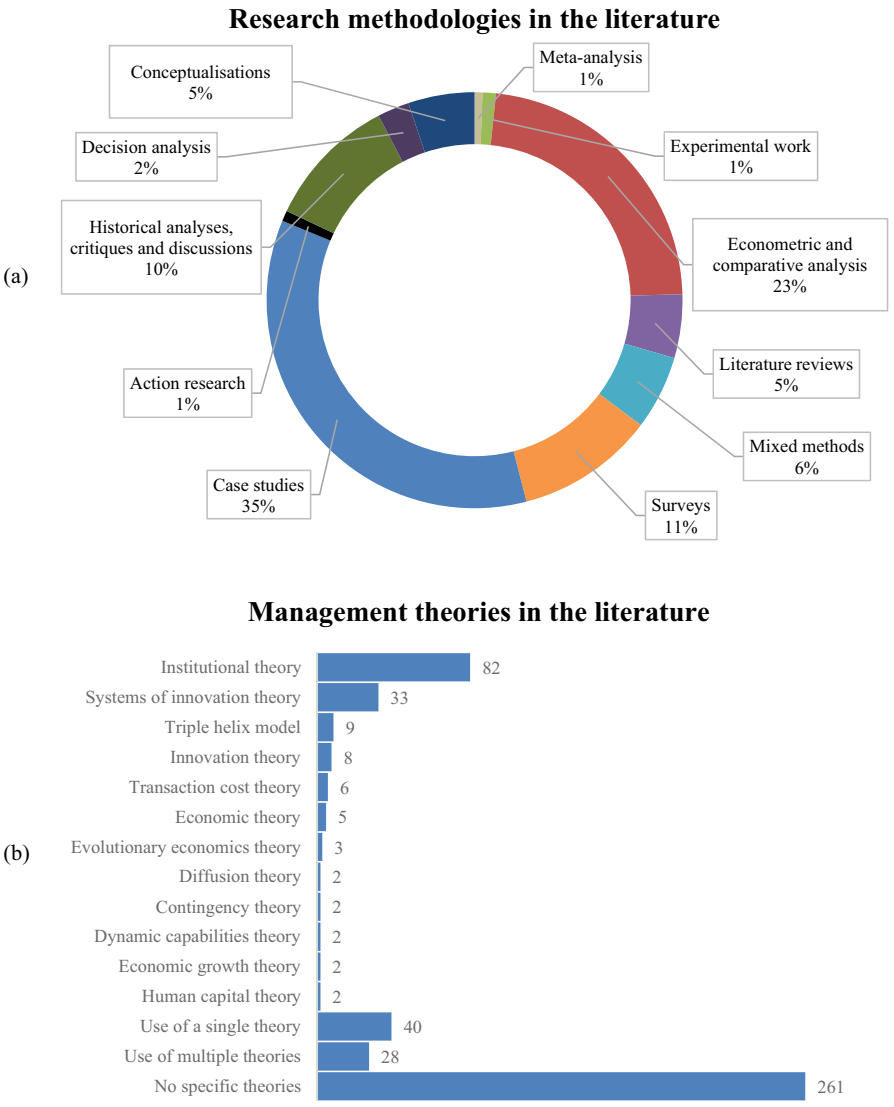

Fig. 4 Analysis of review data according to **a** methodologies and **b** management theories used in studies

involving critiques, discussions, and historical analyses (50 articles). The review also contains studies using mixed methods (29 articles), literature reviews (24 articles), conceptual pieces (25 articles), decision analysis using techniques such as simulation and multi-criteria decision analysis (12), experimentation (5 articles), action research (4 articles), and meta-analysis (3 articles).

The analysis also finds, as shown in Fig. 4b, strong theoretical underpinnings for institutional innovation studies, with institutional theory, rather unsurprisingly, dominating coverage with use in 95 sources (82 usages in isolation and

an additional 13 usages from the 28 studies with multiple theories). Some other theories used in the literature include systems of innovation, transaction cost, resource-based view, absorptive capacity, dynamic capabilities, regulatory focus, and social network theories, as presented by Table 3. The reporting phase also involves a synthesis of the findings, consistent with the research protocol, and geared towards presenting the extracted data in a manner that is coherent with

Table 3 Overview of some key management theories in the literature

Theory	Overview	Examples in institutional innovation literature
Institutional theory	Suggests that homogeneity of firm strategies tend to be the net effect of institutional pressures	Testing antecedents and effects of environmental innovation (Berrone et al. 2013; Smink et al. 2015; Chen et al. 2018; Liao 2018; Garrone et al. 2018; la Hiz et al. 2019; Yao et al. 2021) Analysing social innovation processes (Kwon and Motohashi 2017; Turker and Vural 2017; van Wijk et al. 2019; Raghubanshi et al. 2021) Exploring relationships between entrepreneurial behaviour and institutional innovation (Doblinger et al. 2016; Pinho 2017; Maksimov et al. 2017; Fuentelsaz et al. 2018; Onsongo 2019) Examining institutional complexity, constraints, and complementarities (Lee and Yoo 2008; Sharma et al. 2010; Zhu et al. 2012; Ma et al. 2015; Wang et al. 2015; Siltaloppi et al. 2016; Wu et al. 2019; Sena et al. 2021)
Systems of innovation theory	Analyses networks of public and private institutions in sectors involved in initiating, importing, modifying, and diffusing new technologies	*Conceptualising and empirically studying* Regional innovation systems (Cooke et al. 1997; Fritsch and Schwirten 1999; Asheim and Coenen 2006; Oyelaran-Oyeyinka 2006; Li 2015; Fischer and Tello-Gamarra 2017; Abramov et al. 2019; Lund and Karlsen 2020) Sectoral innovation systems (Geels 2004; Rosário et al. 2013; Kukk et al. 2016) National innovation systems (Hung 2000; Dodgson 2009; Hung and Whittington 2011; Watkins et al. 2015; Jiang and Zhang 2020; Kang and Jiang 2020; Afshari-Mofrad et al. 2021; Perry 2021)
Transaction cost theory	Posits that governance structures are determined by relative costs for managing transactions	Analysing institutional responses to technological advances (Holloway 2000; Dimitri et al. 2009) Studying the problem of illegal subdivided units, using a big data approach (Yau and Lau 2018) Analysing propensity to collaborate (Sena et al. 2021)
Agency theory	Suggests that relationships between principals and agents should reflect efficient organisation of information and risk-bearing costs	Assessing the dynamics of institutional relations and behaviour (Ross 1989; Lui et al. 2016) Analysing institutional responses to technological advances (Hoskisson et al. 2002; Dimitri et al. 2009)
Resource based view	Proposes that heterogeneity of firm level capabilities induces disparities in competitiveness	Testing antecedents and effects of environmental innovation (Nikolaou et al. 2010; Aragon-Correa and la Hiz 2016; Chen et al. 2018; Mohsen et al. 2021) Examining enablers for institutional innovation (Wu et al. 2019; Saka-Helmhout et al. 2020)

Table 3 (continued)

Theory	Overview	Examples in institutional innovation literature
Social capital theory	Predicts that social relationships are resources that shape how far an individual establishes power and influence	Analysing the social ties of institutional entrepreneurs (Chen et al. 2021) Examining legitimacy and trust of social open innovation (Didenko et al. 2020)
Contingency theory	Posits that effective actions are reliant on contexts and situations	Exploring the influence of technological innovations (Fritsch 2015; Phornlaphatrachakorn 2019; Mohsen et al. 2021)
Innovation diffusion theory	Measures individual perception of innovation using constructs of relative advantage, ease of use/complexity, visibility, compatibility, results demonstrability, image, and voluntariness of use	Analysing the adoption of technology and quality standards (Wang and Swanson 2007; Kasperavičiūtė-Černiauskienė and Serafinas 2018)
Dynamic capabilities theory	Suggests that dynamism of firm level capabilities induces disparities in competitiveness	Exploring institutional and human capital factors that influence innovation performance (Asiedu et al. 2020; Zapata-Cantu and González 2021)
Triple helix model	Analyses innovation-based triple-helix collaboration between university, industry, and government	Studying the role of higher education institutions within helix innovation networks (García and Velásquez 2013; Gretchenko et al. 2018; Gachie 2020)
Social network theory	Analyses individual and organisational interactions within the context of larger relational structures	Investigating network influences of formal and informal ties (Gao et al. 2017; Wang et al. 2019b)
Absorptive capacities theory	Suggests the innovativeness and flexibility of firms is shaped by abilities for recognising, assimilating, transforming, and applying valuable external knowledge	Assessing links between institutional forms and innovation performance (Foray and Woerter 2021)
Actor network theory	Proposes heterogeneous networks consisting of social and technological nodes	Understanding the logic for institutional innovation (Waldorff 2013)
Cultural dimensions theory	Measures differences in culture according to individualism/collectivism, power distance, uncertainty avoidance, and masculinity/femininity	Exploring cultural differences on the proactivity of institutions for innovation (Bennett and Nikolaev 2020)

Table 3 (continued)

Theory	Overview	Examples in institutional innovation literature
Normalisation process theory	Posits on factors that foster and inhibit the embeddedness of complex interventions in everyday tasks	Exploring enablers for social innovation (Windrum et al. 2018)
Resource-dependency theory	Argues that organisational behaviour must be understood in the context of that behaviour with regards to distribution of power and control within/outside the organisation	Analysing the social ties of institutional entrepreneurs (Chen et al. 2021)
Regulatory focus theory	Posits on motivational regulation and processes according to promotion that motivates individuals to minimise the discrepancies between their actual and desired states, and prevention that motivates individuals to maximise the discrepancies between their actual and undesired states	Examining the influence of promotion and prevention foci on institutional innovation (Cowden and Bendickson 2018)
Social identity theory	Proposes that social groups give their members orientations for self-reference and establish the members' place in society	Modelling collective action for institutional change (Hargrave and Van De Ven 2006)
Systems theory	Argues that order naturally emerges in organisations as resources are exchanged with their environments	Analysing blends of entrepreneurial and institutional endeavours within ecosystems for innovation (Jucevicius et al. 2016)

the review objective and intended outcomes (Kitchenham and Charters 2007). Synthesis during the review is descriptive and intended to present clusters and outlines of the key determinants and management priorities for institutional innovation. In establishing the determinants, the review creates categories of concepts that serve as the phenomena investigated. For management priorities, the review applies clustering to capture themes that underscore focal points for management and interventions to enhance institutional innovation. Applying conceptual and thematic analysis is consistent with the systematic review methodology (Khan

et al. 2003; Durugbo 2020) and enables the review to present the findings in a form suitable for dissemination. The next section reports the findings of the synthesis of articles.

4 Main determinants of institutional innovation

Literature suggests institutional innovation management exists in four main contexts: organisational, environmental, social, and governmental. These innovation contexts strengthen the contribution of intangible resources (e.g., proximity, relational capital, cooperation, and learning) as sources of economic growth. Constructs such as the quadruple helix (Schütz et al. 2018),[2] posit on actors and systems for these contexts with institutions pursuing radical (Gao et al. 2015; Martínez-Pérez et al. 2019; Qing et al. 2019; Ventura et al. 2020), incremental (Vermeulen et al. 2007b), and in some cases, frugal (Kunamaneni 2019; Ananthram and Chan 2021; Jayabalan et al. 2021) innovations.

Organisational innovation presents the core context for institutional innovation, harnessing the potentials of open and technological innovations, and delivering breakthrough processes and products in areas such as healthcare (Laurell 2018), finance (Boulanger and Gagnon 2018), and education (Sein-Echaluce et al. 2017; Boroujerdi et al. 2020; Thani et al. 2021). Delving into complexities of intra- and inter-organisational innovation underlines the significance of new ventures and enterprise (Fuentelsaz et al. 2018), innovativeness and innovative behaviour (Sun et al. 2017; Da Silva 2019), and innovative investment and funding (Huston et al. 2015) for sustaining economic growth of cities and communities. With increasing awareness of an emergent environmental crisis, institutions also pursue *environmental* (green and eco forms of) *innovations* aimed at sustainable development (Adomssent and Michelsen 2006; Wang et al. 2019a). Eco-friendly energy sources (e.g., solar, hydro and wind) and practices (e.g. reverse logistics) afford institutions with opportunities for enhancing nature's resilience to environmental pressures and for promoting responsible and accountable use of natural resources (Huang and Yang 2014; Polzin et al. 2016; Chen et al. 2018). This context motivates studies of management strategies such as stringent environmental regulations (Chu et al. 2018; Yao et al. 2019), reverse logistics (Aguilera-Caracuel and Ortiz-de-Mandojana 2013; Huang and Yang 2014), brand equity (Yao et al. 2021), and mobilisation of private finance (Polzin et al. 2016). Additionally, institutions chase *social innovations* in efforts to address complex social problems such as income inequality, poverty alleviation, urban mobility, and persistent societal and endemic violent conflicts. The intent is to create societal value (Turker and Vural 2017) and promote social enterprise (Kolk and Lenfant 2015; Venugopal and Viswanathan 2019) in conflict-affected areas plagued by institutional gaps. Co-creating and legitimating social innovation (Onsongo 2019; Kumari et al. 2020) becomes paramount as institutions explore agents of social change for sectoral diffusion patterns (Peirce 1991; Windrum et al. 2018) along with empowerment in public welfare for

[2] Network of actors from academia, industry, government, and the public.

marginalised citizens and local communities that creates opportunities for positive change (Andersen and Bilfeldt 2017). *Governmental* (regulatory or policy (Costa-Font and Puig-Junoy 2007)) innovation involves initiatives by governments that seek to confront discrepancies between the existing and attainable quality of life for citizens (Shaffer 1969). These discrepancies stem from issues surrounding employability, inequality in advanced economies, over-concentration of wealth for few at the top of the income distribution (Biurrun 2020; Fumasoli and Rossi 2021). Examples of policy innovations include the New Deal legislation of the 1930s that generated economic value in the form of reduced risk and increased rewards for farmers (Farrell and Runge 1983) and the Federal Reserve Act of 1913 for supporting bankers (Ferderer 2003). Intergovernmental bodies also implement policy innovation, e.g., the Birds and Habitats Directives that targets the sustainable conservation of natural habitats and species (Beunen and Kole 2021). Traditionally the mode for socioeconomic advances by contemporary societies (Rickards et al. 1996; Tingey and Webb 2020), recent studies highlight the increasing use of innovative policy toolboxes by local, national, and regional governments of emerging economies (May 2008; Helleiner and Wang 2018; Tang et al. 2020b) for boosting collaboration (Gachie 2020) and effectiveness (Rodríguez-Pose and Zhang 2020).

In view of these contexts, this analysis of the literature identifies four categories of determinants for institutional innovation: (i) institutional quality and control, (ii) institutional diversity and reputation, (iii) institutional value and output, and (iv) institutional reform and improvement. Table 4 summarises these key determinants, and the next subsections outline the main concepts within the categories.

Table 4 Main determinants of institutional innovation

Determinants	Overview	Categories	Main concepts
Institutional quality and control	Analysing the efficiency and dexterity of innovation inputs	Quality	*Institutional support system* (Shin 2004; Lobe and Berkes 2004; Xie 2006; Malva et al. 2013; Lisowska and Stanisławski 2014; Barros 2015; Juk and Fuck 2015; Ferguson and Carnabuci 2017; Fischer and Tello-Gamarra 2017; Huang et al. 2017; Salandra 2018; Ervits and Zmuda 2018; Rodríguez-Pose and Zhang 2020; Ruan and Liu 2021; Mosconi and D'Ingiullo 2021) *Institutional networks* (Fritsch and Schwirten 1999; Bahlmann and Spiller 2009; Schøtt and Jensen 2016; Schütz et al. 2018) *Legal systems* (Yi et al. 2017; Boudreaux 2017) *Strategic leadership* (Arun et al. 2020) *Quality assessment systems* (Wiklund et al. 2003; Sharma et al. 2010; Egan 2013; Wu et al. 2016; Kasperavičiūtė-Černiauskienė and Serafinas 2018; Jun et al. 2021) *Technology use* (Wu et al. 2016; Kawabata and Camargo Junior 2020)
		Control	*Governance control systems* (Doloreux et al. 2007; Lee and Yoo 2008; Rahman et al. 2009; Yang et al. 2017; Bekhet and Latif 2018; Yang 2018; Patterson and Huitema 2019; Agarwal 2020; Alamad et al. 2021) *Control policies* (Buck and Rath 1970; Harding 2000; Hart 2001; George and Prabhu 2003; Molnár 2004; Na et al. 2007; Vermeulen et al. 2007a, b; Vasudeva 2009; Niosi 2010; Liu et al. 2011; Andrew 2012; Doblinger et al. 2016; Karaulova et al. 2017; Corsini et al. 2018; Kapetaniou et al. 2018; May and Schedelik 2019; Allen et al. 2020; Oborn et al. 2021) *Internal control system* (Ruan and Liu 2021) *Institutional ownership* (Cooke and Saini 2010; Yi et al. 2017; Rong et al. 2017; Asiedu et al. 2020; Bennett and Nikolaev 2020; Kang and Jiang 2020; Li et al. 2020; Afshari-Mofrad et al. 2021; Sharma and Sharma 2021; Bentzen et al. 2021; Godlewska 2021; Hussen and Çokgezen 2021)

Table 4 (continued)

Determinants	Overview	Categories	Main concepts
Institutional diversity and reputation	Investigating the status and heterogeneous nature of institutional actors	Diversity	*Knowledge externalities* (Wu et al. 2015; d'Agostino and Scarlato 2019) *Capabilities* (Li 2015; Yeung 2015; Petruzzelli and Rotolo 2015; Aragon-Correa and la Hiz 2016; Kang and He 2018) *Policies* (De Mothe 1995; Kafouros et al. 2015; Arribas 2020) *Technology* (Mutenje et al. 2016; Hinings et al. 2018) *Actors* (de Zubielqui et al. 2015; van Wijk et al. 2019; Wu and Park 2019) *Partnership* (Whitley 2014; Petruzzelli and Rotolo 2015) *Strategy* (Drenth 1996; Unger and Zagler 2003; Wu 2013; Sartor and Beamish 2014) *Networking* (Van Bockhaven et al. 2015; Smith and Thomas 2015)
		Reputation	*Strategy* (Pesti et al. 2019; Kalkabayeva et al. 2021) *Process* (Hargrave and Van De Ven 2006; Ottenbacher and Harrington 2009; Hao and Yunlong 2014; Venugopal and Viswanathan 2019)
Institutional value and output	Evaluating the fit and benefit of innovation outputs	Value	*Institutional* logic (Cestino and Berndt 2017; Xie et al. 2019) *Network* engagement and relationship (Kwan and Chiu 2015; Yang 2016) *Capabilities* (Goldsmith 1988; Woodhill 2010; Ito et al. 2016; Barasa et al. 2017) *Knowledge* (De Laurentis 2006; de Zubielqui et al. 2015; Kwan and Chiu 2015; Boudreau and Lakhani 2016) *Strategy* and *strategic leadership* (Koh 2006; Wallman 2009; Jayabalan et al. 2021)
		Output	*Partnership* (Krishnan and Jha 2012; Azadegan et al. 2013; Rosário et al. 2013; Robin and Schubert 2013; Kolk and Lenfant 2015; Pesti et al. 2019) *Ownership* (Kim et al. 2019; Didenko et al. 2020) *Governance* (de la Mothe 2004; Wallman 2009; Hu 2014; Vecchi et al. 2015; Oppong 2016) *Technology* (Wiskerke and Roep 2007; Quiroga and Martin 2017; Markey-Towler 2020; Mohsen et al. 2021) *Economic condition* (Kochhar and David 1996; Haggard and Zheng 2013; Corsi and Prencipe 2019; Kim et al. 2019) *Capabilities* (Oi 2004; Kwan and Chiu 2015; Styhre and Remneland-Wikhamn 2016; Cestino and Berndt 2017; Gehman and Höllerer 2019; Yu et al. 2020; Khan and Gulati 2021)
Institutional reform and improvement	Scrutinising the genesis and metamorphosis of institutional arrangements	Reform	*Economic condition* (Patel and Burra 1994; Kasper 1994; Simpson 2005; Hoque et al. 2011; McCarthy et al. 2014; Zhang and Putzel 2016; Khan and Gulati 2021) *Technology* (Regan 1993; Rasiah 1996; Clark 2002; Sandberg 2007) *Strategic leadership and orientation* (Wang and Swanson 2007; Reed and Wallace 2015; van der Krabben and Lenferink 2018; Jensen and Fersch 2019; Widyani 2019) *Logic and institutional forms* (Nolan and Xiaoqiang 1999; Lazer et al. 2011; Waldorff 2013; Jansson et al. 2013; Huang and Ding 2016; Kooijman et al. 2017; Perry 2021) *Governance* (Shang and Fagan 2006; Yoshikawa et al. 2007; Pascucci and De Magistris 2011; Karaulova et al. 2017; Yang and Al-Sayed 2021)
		Improvement	*Capabilities and externalities* (Drew 1995; Lee and Yoo 2008; Woodhill 2010; Karaulova et al. 2017; Sawang et al. 2017; Antonova and Lomakina 2020) *Governance* (Lane 1986; Nakamura and Born 1993; Lee and Yoo 2008; Ransdell 2019) *Knowledge* (Clark 2002; Velho 2004) *Process* (Fullerton 1986; Drew 1995; Irlenbusch et al. 2003; De Jong and Woolthuis 2008; Tao and Jinchuan 2008; Larsen et al. 2011) *Strategy* (Villavicencio et al. 2015; Smink et al. 2015; Jayabalan et al. 2021) *Constraints* (Hung 2000; Niosi 2010; van Dijk et al. 2011; McCarthy et al. 2014; Turker and Vural 2017; Onsongo 2019; Ananthram and Chan 2021)

4.1 Institutional quality and control

Topically, the most investigated category of determinants and independent variables is *institutional quality and control* that influences efficiency and dexterity of

innovation inputs. Studies focus on institutional quality because empirical evidence suggests this concept influences the ability of firms to acquire advanced technologies (Wu et al. 2016; Kawabata and Camargo Junior 2020) along with the probability, capacity, and intensity of innovation (Rodríguez-Pose and Zhang 2020; Mosconi and D'Ingiullo 2021). Total quality management (TQM) offers a critical paradigm for ensuring quality (Wiklund et al. 2003; Sharma et al. 2010; Kasperavičiūtė-Černiauskienė and Serafinas 2018) while control is a determinant that investigative studies generally agree on but underscore in varying research foci. Examples of these control foci include institutional gatekeepers (Ferguson and Carnabuci 2017), institutional structures (Fischer and Tello-Gamarra 2017), institutional governance (Bekhet and Latif 2018), and internal control quality (Ruan and Liu 2021). However, the most stressed quality and control determinants are patent systems characterised by high levels of formalism (Barros 2015; Ervits and Zmuda 2018) and intended for managing Intellectual Property Rights (IPR) (Malva et al. 2013; Huang et al. 2017; Hou et al. 2018). An alternative but complementary perspective in the literature identifies ownership as a mechanism for quality (Yi et al. 2017) due to links with strategic human resource management that support innovation-oriented business strategies (Cooke and Saini 2010). Research also suggests that institutional strategies embed control in an array of managerial tools, such as institutional support systems that prioritise quality controls for shaping R&D efforts within innovation systems, especially in terms of labour productivity and patenting behaviour (Fischer and Tello-Gamarra 2017). In these circumstances, managerial sense-making (Lee and Yoo 2008; Weber et al. 2019) remains essential to achieving sound long-term performance, on which the legitimacy and sustainability of the selective governance constellation rest.

Although researchers agree on the importance of high performing and pro-innovation institutions, the spotlight on quality and control determinants tend to vary. Measuring efficacy and changeability offers the main interest for some researchers (Bennett and Nikolaev 2020; Afshari-Mofrad et al. 2021), while others analyse factors related to innovation performance (Asiedu et al. 2020; Bentzen et al. 2021; Godlewska 2021) or the performance of institutional entities such as firms (Li et al. 2020; Hussen and Çokgezen 2021), and universities (Sharma and Sharma 2021). The latter interest informs the use of analytical constructs like the quadruple helix, which add a layer of network control for engagement (Schütz et al. 2018; Kang and Jiang 2020). This layer taps into huge potentials for high quality collaborative innovation for confronting grand challenges (e.g., climate change and urban mobility) facing modern societies.

4.2 Institutional diversity and reputation

Next, *institutional diversity and reputation* offer the next category of determinants investigated by researchers. Here, the emphasis remains on understanding the roles of heterogeneous (de Zubielqui et al. 2015) and diverse (van Wijk et al. 2019) actors in mobilising the emotional energy and reflexive awareness necessary to disrupt the status quo, generate (and negotiate) alternatives, and embed solutions in institutional

contexts to produce profound change. Diversity foci vary in several studies with interests including urban diversity (Smith and Thomas 2015), firm-university partnership diversity (Whitley 2014), and environmental technology diversity (Aragon-Correa and la Hiz 2016). These authors recognise variations in the idiosyncratic capabilities of firms for acquiring and allocating resources (Li 2015; Kang and He 2018) and how these capabilities influence the ability of institutions to generate environmental, social, and economic value for stakeholders (Yeung 2015). For some studies, inequality entrenched in long-standing institutional arrangements is a diversity management challenge for strategies to foster gender inclusivity (Krech 2020) and policies to redress social inequality and poverty (Zapata-Cantu and González 2021). More broadly, highlighted as a puzzle for management scholars, understanding the link between institutional innovation and inequality (Biurrun 2020) is a research focus accentuated by recent macroeconomic shocks due to the global financial crisis of 2007–2008 and COVID-19 pandemic. Due to these shocks and radical perturbations, some researchers (Tomizawa et al. 2020; Hughes et al. 2021) differ in their opinions on the role of diversity, arguing for emphasis on alternate inclusive institutional arrangements that foster inequality due to the breakdown of institutions stemming from major socio-economic and technological transformations in society.

In the literature, institutional reputation contains intrinsic ties to diversity (Wu et al. 2015) and indicates success (d'Agostino and Scarlato 2019). Reputation, in this context, concerns institutional (and organisational) credibility and integrity as viewed by a wide spectrum of stakeholders, including citizens, governmental agencies, customers, and industry. While strong institutional policies build reputation for top-down, up-and-up implementations, focus on organisational level reputation offers a bottom-up, divide-and-conquer alternative. Considering these prospects, researchers examine how carefully considered innovation strategies enable organisations to boost their reputation (Pesti et al. 2019) for attracting top talent (de la Mothe 2004; Dahm et al. 2021), and how institutional information and externalities influence institutional reputation (de Zubielqui et al. 2015).

4.3 Institutional value and output

Insights from the literature suggest that the category for *institutional value and output* offers the most investigated dependent variables for institutional innovation. In the context of institutions, some researchers with 'contributory foci' measure innovation outputs (e.g., using patent numbers and citations (Kim et al. 2019), revenues of new products (Hou et al. 2019), and costs of equity capital (Lui et al. 2016), while arguing that these outputs are part of a multi-faceted structure involving knowledge creation and diffusion (Kwan and Chiu 2015). In contrast, some studies with 'critical foci' investigate the decline of innovative outputs in the context of ties to policy efforts (Kunamaneni 2019), technology use (Mohsen et al. 2021), and the political economy of micro-level institutions (Haggard and Zheng 2013). There are also studies with 'consequential foci' examining the significance of the institutional environment from which organisations operate (Barasa et al. 2017) and the nature of collaboration between institutional entities (e.g., multinational companies

and small-sized life science companies) for harnessing entrepreneurial and creative capacities (Styhre and Remneland-Wikhamn 2016).

Value, which is more inherently beneficiary-oriented and relational, also preoccupies researchers (Styhre and Remneland-Wikhamn 2016; Cestino and Berndt 2017), for public value creation that enhances the life of citizens (Yang 2016) and customer value propositions in transaction rules that benefit clients, buyers, end-users, and so on (Wallman 2009). Overall, determinants in this category strive for an integration of community indicators and government performance management in an iterative cycle of engagement, legitimacy, and execution, with structural developments across borders between civil society, politics, and administration.

4.4 Institutional reform and improvement

Institutional reform and improvement describe a category of determinants essential for transformative processes (i.e., methodical, management and process innovation) within institutions in such a way that different modus operandi and modus vivendi respect human rights, maintain the rule of law, and are accountable to constituents. Primarily the focus of earlier studies (Polopolus 1969; Ruttan and Hayami 1984; Grabowski 1988) and more recent discussions and conceptualisations (Sus 2019; Hughes et al. 2021; Perry 2021), interest in this category centres on discourse surrounding the genesis and metamorphosis of institutions. Earlier works stress the role of agents of change (Ebegbulem 1974; Pred 1978) while more recent expositions give prominence to the implementation of ambitious projects (Williams 2002; Chien 2007), and transparent public–private partnerships (Zhang and Tan 2019; Oppong and Andrews 2020; Yu 2020). Similarly, the nature of change varies among scholars with debates that highlight differing emphasis on socioeconomic and political change (Halpern 2005), change in the new power topology (Clapp et al. 2016), technological change (Mia 2020; Perry 2021), managerial change (Parrado 2008), and technical change for economic development and knowledge acquisition processes (Oyelaran-Oyeyinka 2006; Ruttan 2006). Some studies argue that reform for institutional improvement is crucial, not only to boost quality levels of outputs (Azadegan et al. 2013) but also procedurally to ensure quality exchanges within cooperative networks (Brinckmann 1998). However, other researchers offer a contrasting perspective that considers negative impacts of limits and constraints such as institutional voids in areas of inadequate support (Turker and Vural 2017), triggering a rethinking and reimagining of existing formal institutional frameworks (Onsongo 2019; Chebrolu and Dutta 2021).

Regional policies embed reform and deliver disruptive (hence economic) capabilities and capacities for improvements. In literature, capabilities tend to represent the most essential determinant in institutional innovation (Sawang et al. 2017), and even though this determinant spans different categories of determinants in literature as shown in Table 4, the reform and improvement category heightens the role of capabilities. Insights from policy making and the development of technical standards advance this line of reasoning (Smink et al. 2015) as policy makers wrestle with necessary blends of heterogeneous actions (radical or incremental) (Turker and

Vural 2017; Ventura et al. 2020), agents (internal or external) (Villavicencio et al. 2015), and arrangements (formal or informal) (Fischer and Tello-Gamarra 2017) for successful innovations. Capacities and other conditions for successful institutional reforms also preoccupy scholars with policy suggestions for eased foreign direct investment (McCarthy et al. 2014) and entrepreneurial endeavours that transcend the institutional constraints of national innovation systems (Hung 2000). Some studies view national and local reform in the context of structural and behavioural logics that legitimise social meanings required for reform and improvement (Lazer et al. 2011; Waldorff 2013; Kooijman et al. 2017), with scholars analysing speeds and directions of radical innovation. Although varied in focus, there is somewhat of a consensus on the role of reform and improvements for realising substantial economic growth, and for overcoming challenges of unemployment, inequality, and deprivation.

5 Management priorities for institutional innovation

Synthesis of review data finds six management priorities for enhancing institutional innovation. This review determines these priorities based on appraising management contributions within the literature. These priorities are: (i) network engagement, externalities, and relationships (NEER), (ii) institutional logic, capabilities, and constraints (ILCC), (iii) economic conditions, policies, and intermediaries (ECPI), (iv) institutional strategies, ownership, and governance (ISOG), (v) technology readiness, transfer, and support (TRTS), and (vi) institutional synergies, incentives, and entrepreneurship (ISIE). Table 5 summarises these priorities and the next subsections outline their importance.

5.1 Network engagement, externalities, and relationships

The first of the priorities, *NEER,* reflects the growing significance of managerial social networks for institutional innovation (Kraft and Bausch 2018) in relation to transdisciplinary and interdisciplinary engagement within institutional networks (Blättel-Mink and Kastenholz 2005; Moore 2011) and ecosystems (Boisvert et al. 2013). This thematic group considers dynamics of organisational networks (Hage and Hollingsworth 2000; Schøtt and Jensen 2016), domesticated market networks (Van Bockhaven et al. 2015), inter-organisational relations (Nooteboom 2000), innovation networks (Lyu et al. 2019), connectedness of regional institutions (Liu 2016), networking practices (Minh and Hjortsø 2015), and cohesive networks (Kraft and Bausch 2018). Here, there are management interests in social capital (Nieto and González-Álvarez 2014; Smith and Thomas 2015), social and institutional trust (Audretsch et al. 2018; Didenko et al. 2020), and relationship ties that include managerial ties (Gao et al. 2017; Ventura et al. 2020) and social ties (Chen et al. 2021).

Network partnerships within this theme consider managing interactions in public–private (Kidd 1996; Rosário et al. 2013), state-market (Yu 2020), and industry-academia (Krishnan and Jha 2012) partnerships. Literature also provides other

Table 5 Management priorities for institutional innovation

Priorities	Description	Focus of management
Network engagement, knowledge externalities and relationship	Structural and behavioural engagement within networks to overcome institutional challenges through cooperation and to achieve common objective	*Network engagement based on*: *Social capital* (Hage and Hollingsworth 2000; Gupta et al. 2003; Pearson and Richardson 2008; Sanginga et al. 2010; Nieto and González-Álvarez 2014; Van Bockhaven et al. 2015; Minh and Hjortsø 2015; Liu 2016; Schøtt and Jensen 2016; Audretsch et al. 2018; Kraft and Bausch 2018; Lyu et al. 2019) *Role of actors* (Lynn et al. 1996; Nordberg et al. 2003; Geels 2004; Simmie and Strambach 2006; Lounsbury and Crumley 2007; Frey et al. 2012; Reed and Wallace 2015; de Leeuw and Gössling 2016; Siltaloppi et al. 2016; Llopis and D'Este 2016; Sun et al. 2017; Radaelli et al. 2017; Chen 2018; van Wijk et al. 2019; Lund and Karlsen 2020) *Knowledge externalities and exchanges* (Magalhães 2004; Hamdouch and Moulaert 2006; González-López 2011; Rolfstam 2012; Berraies et al. 2015; Vines et al. 2015; Chittoor et al. 2015; Sein-Echaluce et al. 2017; Boudreaux 2017; Salandra 2018; Liao 2018; d'Agostino and Scarlato 2019; Torres de Oliveira et al. 2020) *Relationships that exist within* *Partnerships* (Darvas 1997; Kruss 2005; Buszard and Kolb 2011; Krishnan and Jha 2012; Rosário et al. 2013; Robin and Schubert 2013; Menzies 2013; Kolk and Lenfant 2015; Pesti et al. 2019; Huber-Stearns et al. 2019) *Ties, treaties, and collaborations* (Richardson 1979; Fritsch and Schwirten 1999; Nooteboom 2000; Balthasar et al. 2000; Watt 2002; Yingbo et al. 2010; Rodima-Taylor et al. 2012; Nieto and González-Álvarez 2014; Nam et al. 2014; Smith and Thomas 2015; Lee and Law 2017; Vickers et al. 2017; Schütz et al. 2018; Hou et al. 2019; Moon et al. 2019; Kunamaneni 2019; Ting et al. 2020; Ventura et al. 2020; Chen et al. 2021) *Sector-based and marketing channels* (Bello et al. 2004; Pistor 2009; Bhanot et al. 2021; Riccomini et al. 2021) *Ecosystems and clusters for innovation* (Janssen and Ostrom 2008; Parto 2008; Boisvert et al. 2013; Jucevicius et al. 2016; Siltaloppi et al. 2016; Quiroga and Martín 2017; Kumari et al. 2020; Monteiro et al. 2021)
Institutional logic, capabilities, and constraints	Practices, symbolic systems, values, beliefs, and rules for generating and organising daily activity, time, and space to offer meaning social realities within institutions	*Logic, design and representation* (Hull 1996; van Waarden 2001; Coriat and Weinstein 2002; Baark 2007; Considine and Lewis 2007; Lee and Yoo 2008; Daly 2008; Magnier-Watanabe and Senoo 2009; Colwell and Narayanan 2010; Lindelöf 2011; Lazer et al. 2011; Azadegan et al. 2013; Bin et al. 2013; Waldorff 2013; McCarthy et al. 2014; Bunda et al. 2014; Piana et al. 2015; Llopis and D'Este 2016; Kooijman et al. 2017; Cestino and Berndt 2017; Vickers et al. 2017; Chen et al. 2018; Martin et al. 2018) *Capabilities* (Whitley 2000; Kwon et al. 2009; Hsu et al. 2012; Li 2015; Rasiah et al. 2016; Styhre and Remneland-Wikhamn 2016; Aragon-Correa and la Hiz 2016; Gretchenko et al. 2018; Kang and He 2018; Webster and Gardner 2019; Kunamaneni 2019) *Constraints* (Bunduchi et al. 2015; Turker and Vural 2017; Malen and Vaaler 2017; Onsongo 2019; Arranz et al. 2021)
Economic conditions, policies, and intermediaries	Current economic position of nations or regions that evolves according to institutional cycles	*Economic conditions* (Baker 1989; Zweifel 1995; Heher 2006; Hyvärinen 2006; Vermeulen et al. 2007b; Haggard and Zheng 2013; Sartor and Beamish 2014; Ma et al. 2015; Fritsch 2015; Clark and Monk 2016; Pinho 2017; Yang et al. 2017; Elle 2017; Vickers et al. 2017; Kapetaniou et al. 2018; Yang 2018; Jiang and Yuan 2018; Aziz et al. 2019; Corsi and Prencipe 2019; Kim et al. 2019) *Policies* (Epstein 1994; Harding 2000; Hart 2001; George and Prabhu 2003; Molnár 2004; Na et al. 2007; Vermeulen et al. 2007b; Vasudeva 2009; Niosi 2010; Adebowale 2012; Doblinger et al. 2016; Ito et al. 2016; Kwon and Motohashi 2017; Corsini et al. 2018; Kapetaniou et al. 2018; Allen et al. 2020) *Intermediaries* (Hüsig and Mann 2010; Ma et al. 2014; Chen et al. 2015; Watkins et al. 2015; Polzin et al. 2016; Landoni 2017; Radaelli et al. 2017)
Institutional strategy, ownership, and governance	Strategies for managing institutional actors to ensure long term success while maintaining socioeconomic stability and sustainability	*Strategy* (Ross 1989; Drew 1995; Brinckmann 1998; Hage and Hollingsworth 2000; Koh 2006; Wallman 2009; Cooke and Saini 2010; Kitagawa and Robertson 2011; Hung and Whittington 2011; Sartor and Beamish 2014; Villavicencio et al. 2015; Smink et al. 2015; Abramov et al. 2019; Yang et al. 2019; Yano and Shiraishi 2020) *Institutional ownership* (Hoskisson et al. 2002; Yi et al. 2017; Sakaki and Jory 2019) *Participatory governance* (Whitley 2000; Casper and Matraves 2003; Yoshikawa et al. 2007; Rahman et al. 2009; Genus 2012; Li et al. 2012; Yi et al. 2012; Clausen 2014; Zhang and Putzel 2016; Yang et al. 2017; Elle 2017; Bekhet and Latif 2018; Yang 2018; Huber-Stearns et al. 2019)
Technology readiness, transfer, and support	Technology skills, methods, and processes used to achieve institutional goals	*Technology readiness* (Abrahamson and Rosenkopf 1993; King et al. 1994; Hung 2000; Clark 2002; Nelson and Nelson 2002; Nagamatsu et al. 2006; Wiskerke and Roep 2007; Huston et al. 2015; Lui et al. 2016; Zhang and Putzel 2016; Quiroga and Martín 2017; Nite and Washington 2017; Yau and Lau 2018; Webster and Gardner 2019; Hou et al. 2019; la Hiz et al. 2019; Lyu et al. 2019; Markey-Towler 2020; Mishchenko et al. 2021; Xie and Yang 2021; Oborn et al. 2021; Mohsen et al. 2021) *Technology transfer and partnerships* (Clark and Clay 1987; Zweifel 1995; Mason and Wagner 1999; Kwon et al. 2009; Lauto et al. 2013; Suzuki 2015; Rosenbusch et al. 2019; Blake et al. 2021) *Technology support and adaptation* (Kikuchi and Hayami 1983; Regan 1993; Orihata and Watanabe 2000; Abereijo et al. 2009; Chhetri et al. 2012; Hsu et al. 2012; Malva et al. 2013; Barros 2015; Juk and Fuck 2015; Ferguson and Carnabuci 2017; Huang et al. 2017; Hinings et al. 2018; Bjornlund et al. 2020; Bierut and Dybka 2021)
Institutional synergies, incentives, and entrepreneurship	Entrepreneurial ventures driven by complementary capabilities and incentivisation within institutions	Realising synergetic competences through *Collaborative philosophies of co-creation, co-management, and co-decisions* (Shackleton and Raunio 2003; Léopold et al. 2019; Casagrande et al. 2021) *Complementarities of roles and arrangements* (Gallery and Gordon 2008; Lee and Yoo 2008; Garrick et al. 2011; Corsi and Prencipe 2019; Da Silva 2019; Wu et al. 2020; Cechin et al. 2021) *Incentivising institutional actors* (Levien 1971; Tyson 1979; Hyvärinen 2006; Carney and Zheng 2009; Jun and Weare 2011; Shu et al. 2016; Qu et al. 2017; Suparjo 2017; Desmet et al. 2020; Tang et al. 2020a; Wang and Deng 2021) *Entrepreneurial mind-sets in institutions* (Munene 1995; Hyvärinen 2006; Wang and Swanson 2007; Jun and Weare 2011; Van Wijk et al. 2015; Albertini and Muzzi 2016; Maksimov et al. 2017; Cowden and Bendickson 2018; Laurell 2018; Tumbas et al. 2018; Widyani 2019; Jensen and Fersch 2019; Phornlaphatrachakorn 2019; Etzkowitz et al. 2019; Rahman et al. 2019; Tang et al. 2020b)

network arrangements in the form of collaborations among industry, university, and research institutions (Yingbo et al. 2010), R&D collaborations (Hou et al. 2019), helix innovation networks (Schütz et al. 2018), public research institutions (Fritsch and Schwirten 1999), university-industry links (Kunamaneni 2019), and multi-level institutional linkages (Rodima-Taylor et al. 2012). Significant in institutional collaborations and partnerships is the role of institutional actors (Lounsbury and Crumley 2007; Chen 2018) who substantially influence the creation of new practice, innovation capability, commercialisation of new technology, and institutional arrangements. Specifically, research studies allude to network actors such as executive and middle managers (Radaelli et al. 2017), beneficiaries (Llopis and D'Este 2016), fierce competitors (Frey et al. 2012), suppliers (Nordberg et al. 2003), external actors (Sun et al. 2017), and elites (Geels 2004). These salient actors play a role in shaping innovation networks by influencing the preservation of socioeconomic order and investment in innovation. With this in mind, some studies concentrate on the multi-faceted nature of institutional actors through probes of actor perceptions, activities, and diversity (Lynn et al. 1996; van Wijk et al. 2019), institutional learning (Buttoud et al. 2011), and the increasing use of innovation 'offshoring' that creates global innovation networks (Desai 2009).

This theme also prioritises the management of institutional knowledge–related imperatives stemming from network interactions. Example of these imperatives are knowledge externalities (d'Agostino and Scarlato 2019), knowledge spirals (Sein-Echaluce et al. 2017), and knowledge acquisition (Rutherford 2001; Chittoor et al. 2015; Liao 2018) that influence innovation orientation. There are also interests in links between knowledge and creativity (Boudreaux 2017), new knowledge bases (Asheim and Coenen 2006; Rolfstam 2012), and the knowledge infrastructure that facilitates knowledge creation, diffusion, and accumulation in institutions (Hamdouch and Moulaert 2006; Gittelman 2006; Iqbal 2021).

5.2 Institutional logic, capabilities, and constraints

The second priority is *ILCC*, which encompasses configuration- and proficiency-related management for problem solving and optimising decisions under constraints. Contributions in this thematic grouping consider improvements in the configurations of institutional logic (Kooijman et al. 2017; Cinar and Benneworth 2021), institutional logic differences (Azadegan et al. 2013; Llopis and D'Este 2016), interplay of logics (Vickers et al. 2017), service dominant logic (SDL) and servitization (Cestino and Berndt 2017), and legacies (Baark 2007). Grounding these logics are distinctive capabilities (Kunamaneni 2019) in areas of governance structures (Rasiah et al. 2016), forecasting and planning of skilled labour (Gretchenko et al. 2018), institutional readiness (Webster and Gardner 2019), and so on. These sources offer a discourse suggesting diversity of capabilities as a source of innovative strength for institutions. Thus, context assumes an important role for institutional innovation with varying interests in institutional (Colwell and Narayanan 2010; Lindelöf 2011), country (Lee and Yoo 2008), and cultural (McCarthy et al. 2014; Piana et al. 2015) contexts.

Yet, empirical evidence suggests these positive enabling priorities may possess negative constraining concerns contingent on circumstances. For instance, there are studies on institutional inhibitors such as organisational slack (Malen and Vaaler 2017), institutional voids (Turker and Vural 2017; Onsongo 2019), and institutional misalignments (Bunduchi et al. 2015). This contradiction motivates studies on institutional environments with focus on corporate governance (Yi et al. 2012), and professional resistance (Radaelli et al. 2017). Institutional theory also posits on isomorphic, coercive, normative, and mimetic pressures as affecting environments that enact institutional innovation with interests in links with religion (Assouad and Parboteeah 2018), and alliances (Alexander 2012). The complexity of environments within which institutions operate also elevates the importance of designs for innovation systems and new international ventures (Hargrave and Van De Ven 2006; Boudreau and Lakhani 2016).

5.3 Economic conditions, policies, and intermediaries

ECPI is the next priority with themes detailing management of production and consumption conditions. Financial management lies at the heart of economic imperatives for commercialisation, investment, managerial incentives, costs, profitability, and shareholding in terms of institutional innovation. These imperatives motivate research interest, particularly in relation to financial (Vermeulen et al. 2007b) and microfinance (Elle 2017) services for addressing concerns such as investment horizons (Kim et al. 2019), economic returns (Heher 2006), transaction costs (Aziz et al. 2019), and financial fraud (Yang et al. 2017). These constructs aid in examining innovation outputs (e.g., patents), composition of the firms in joint ventures, and investment objectives for incremental and radical innovation.

Economic policies are themes involving guidelines, procedures, or processes for achieving rational objectives and outcomes. Policies considered within the literature include public (Adebowale 2012; Doblinger et al. 2016; Allen et al. 2020), innovation (Liu et al. 2011; May and Schedelik 2019), community (Molnár 2004), institutional (Niosi 2010), technology (Harding 2000; George and Prabhu 2003; Vasudeva 2009), and antitrust (Hart 2001) policies. Effective management under these policies depend on legitimacy, investment efforts, risk-taking behaviour, technological stalemate, and evolutionary trajectories. Studies also identify institutional intermediaries (Watkins et al. 2015; Landoni 2017) and their economic impact on innovativeness for climate change, innovative capability for public procurement, brokering knowledge in networks, and commercialisation of technologies.

5.4 Institutional strategies, ownership, and governance

ISOG is the management priority that steers and coordinates efforts towards enhancing innovation levels and improving institutional performance. In this context, institutional innovation scholarship proposes governing procedures and practices in concepts of governance structure (Whitley 2000; Casper and Matraves 2003), governance institution quality (Bekhet and Latif 2018), financial governance

(Hyvärinen 2006), corporate governance (Yoshikawa et al. 2007; Yang et al. 2017), participatory governance (Forde 2020; Kalinowski 2020), and institutional arbitrage (Clausen 2014). Challenges to empower stakeholders spur increasing shifts from government to governance (Nielsen et al. 2004; Clapp et al. 2016) with goals of gaining legitimacy from transformational and executive leadership that facilitates institutional change and reform (Williams 2002; Asiedu et al. 2020). The literature also accentuates institutional strategies (Brinckmann 1998; Villavicencio et al. 2015; Smink et al. 2015), legitimacy (Hung and Whittington 2011), open innovation strategies (Kitagawa and Robertson 2011; Smink et al. 2015; Abramov et al. 2019), strategic transactions and dialogue (Wallman 2009), offshoring innovation strategies (Sartor and Beamish 2014), and growth strategies (Koh 2006). For other scholars, ownership of rights and control serves as the foundation for strategies on institutional innovativeness. Here, the interest of research lies in the mechanisms that structure institutional ownership (Cooke and Saini 2010; Yi et al. 2017), equity ownership and institutional investors (Sakaki and Jory 2019), and state ownership (Yi et al. 2017).

5.5 Technology readiness, transfer, and support

The next management priority is *TRTS*, which plays a crucial role in institutional innovation levels and economic progress for countries (Clark 2002). The suggestion is that technology readiness to fulfil the needs of institutions remains a focal point for research (Webster and Gardner 2019; Markey-Towler 2020; Mohsen et al. 2021), and motivates studies on technology co-evolution, employment relations, institutional conflicts (Hung 2000; Costa and Horn 2021), and technological institutional reform (Clark 2002). In some technology readiness studies, researchers focus on technology development (Lee 2012) and available technological capabilities (la Hiz et al. 2019) for global innovations. Authors also explore institutional readiness in the context of technological foresight for facing future challenges (Quiroga and Martin 2017). From earlier emphasis on adoption and rejection stemming from institutional bandwagon pressures, the debate in the literature somewhat shifts to diffusion trajectories of continuous self-propagating technological innovation by institutions (Matzner 1985; Abrahamson and Rosenkopf 1993; Nagamatsu et al. 2006). Examples of these technologies include big data analytics (Yau and Lau 2018), telemedicine (Oborn et al. 2021), electronic cash transfers (Zhang and Putzel 2016), the Internet of Things (Xie and Yang 2021), and smart contracts based on financial technologies (Mishchenko et al. 2021).

In furtherance of readiness, technology transfer and support tend to play crucial roles in institutions of some emerging economies and sectors with low technological intensity. Empirical evidence in some studies link technology transfer to innovation diffusion patterns (Zweifel 1995; Kwon et al. 2009; Barbosa and Faria 2011) and knowledge transfer (Mason and Wagner 1999). Other studies consider internationalisation (Kumar et al. 2013; Suzuki 2015) and innovation offshoring (Rosenbusch et al. 2019) in the context of technological barriers and institutional arbitrage strategies. Within the literature, IPR is a technology-related concept crucial to supporting

innovation. Here, the focus is on patents as a protection entity with research examining IPR in terms of geographical indicators (Juk and Fuck 2015), rights (Malva et al. 2013; Huang et al. 2017), sources (Abereijo et al. 2009), patent behaviour (Barros 2015), and domain-spanning patent applications (Ferguson and Carnabuci 2017). Management challenges confronted within existing IPR research for institutional innovation include patenting strategies, infringements of property rights, and new SME production and knowledge recombination strategies.

5.6 Institutional synergies, incentives, and entrepreneurship

The final priority is *ISIE* that influences the pooling of complementary resources for new ventures by institutions and institutional actors. Recognising the need for synergies to deliver new solutions and systems, researchers tend to agree on the need for co-creation (Kumari et al. 2020; Sharma and Sharma 2021), co-management (Léopold et al. 2019; Casagrande et al. 2021), and co-decisions for institutional resources (Shackleton and Raunio 2003). For instance, modern innovative drugs increasingly require co-development by pharmaceutical enterprises and scientific research institutions (Wang and Huang 2020). Thus, the complementary nature of institutions (Da Silva 2019), institutional roles (Garrick et al. 2011) and institutional arrangements (Lee and Yoo 2008; Corsi and Prencipe 2019), serves as foci for some studies seeking to improve integration and accountability in institutions.

Alternate perspectives note the need to manage convergence into cross-border innovations, symbiotic relationships, and collaborative agglomeration for regions (Singh and Allen 2006; Li and Xing 2020; Knickel et al. 2021). Technically, there are also enduring institutional challenges for co-generation e.g. of heat and electricity (Chartock et al. 1985). In these contexts, synergetic innovation serves as the mission for arrangements such as industry-university-research collaboration (Xu et al. 2020), and public–private partnership (Zhang and Tan 2019; Cechin et al. 2021).

For some scholars, entrepreneurship is the cornerstone of strategies for institutional innovation. However, these authors vary in their underlying viewpoints, with interests in institutional entrepreneurs (Wang and Swanson 2007; Jensen and Fersch 2019), entrepreneur roles (Tumbas et al. 2018), entrepreneurial mind-sets (Cowden and Bendickson 2018), the influence of quality on entrepreneurship (Veiga et al. 2020), and interfaces between entrepreneurship and marketing (Laurell 2018). Irrespective of the viewpoint, the necessity- and opportunity-based nature of entrepreneurs guides researchers in positing and analysing entrepreneurship links with economic growth (Galindo-Martín et al. 2020). Closely linked to motivating entrepreneurial endeavours within institutions is the role of incentives, which literature links to the overcoming of market failures (Tang et al. 2020b) and the implementation of regulations (Costa-Font and Puig-Junoy 2007). In the literature, there are additional accounts on the importance of executive incentives (Wang and Deng 2021), producers' incentives (Desmet et al. 2020), incentive properties of income-sharing arrangements (Tyson 1979), and managerial incentives (Hyvärinen 2006; Jun and Weare 2011; Tang et al. 2020a). Yet, it is worth noting that the presence

of conflicting incentives may ultimately undermine innovation efforts (Carney and Zheng 2009).

6 Future research directions for institutional innovation scholarship

Using insights from the literature, this review contributes to research by proposing a multi-level model for managing institutional innovation, as shown by Fig. 5. Premised on a background of literature arguing for induced, collective, and continuous genesis of institutional innovation, and supported by injections or 'pumps' of investments, the model advances knowledge by summarising the findings of the review in terms of key institutional determinants and management priorities. The main argument of the model is that innovation contexts shape the key determinants within institutions and that these determinants influence management priorities for institutional innovation. Our multi-level framing of priorities, determinants, and contexts, offers a set of factors that adds to the discourse concerning the need for more holistic assessments of institutional foundations, which current research elaborates in the form of deep institutional foci (Hughes et al. 2021), and co-evolution processes (Costa and Horn 2021). However, in practice, far from suggesting a panacea for managing the challenges and opportunities in institutions, the model, through the systematic insights from the literature, offers a research perspective on potential critical factors for stage-managing and enacting organisational, social, environmental, and governmental changes via contracts, internalisation, regulation, and referendums. In this section, we use insights from the review to set a research agenda that entails three potential paths for future research.

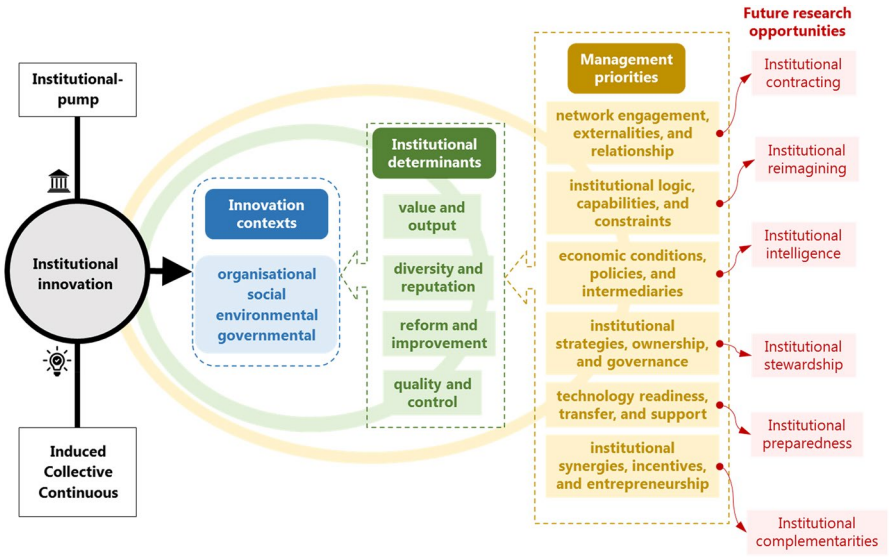

Fig. 5 Multi-level management model of Institutional Innovation

To begin with, a critique of the *theoretical* and *methodological* space in literature provides the first path for future studies. In this context, in current studies and as shown in Fig. 4b, the balance of the theoretical base appears tilted towards institution-oriented theories, particularly institutional theory treated in 95 studies. This raises the prospect for more innovation studies to offset this imbalance by testing existing innovation theories (e.g., diffusion of innovation) in different contexts, examining theories with limited coverage (e.g., the Bass model) in an institutional milieu, and proposing new theories. Current determinants analysed from the review mainly consider the institutional aspects for innovation, as shown by Sect. 4. Thus, examinations driven by more framings of innovation could generate new insights on potential innovation-oriented determinants such as creativity, mindfulness, foresight, innovative climate, etc. *Methodologically*, researchers seem to favour case studies, surveys, essays, and econometric analysis. To a lesser extent, the review indicates interest in the use of decision analysis, meta-analysis, action research, and field experiments. Thus, there is a need for further investigations of the conceptual space for institution innovation using lesser-applied methods along with studies applying novel methods such ethnography, online research, meta-synthesis, phenomenography, and grounded theory. Existing management priorities in the literature mainly reflect macro- and meso-level considerations of institutional innovation, particularly in the context of regional, national, sectoral, and organisational concerns. Accordingly, there is a need for further studies of micro-level considerations, i.e., individual factors that enable or inhibit institutional innovation. For instance, grounded theory or ethnography-based studies could explore and theorise on personas, personalities, and motivations of institutional actors that play major roles in inducing, coordinating collective action, or championing continuous change. Similarly, online research or phenomenography could underpin explorations on the role and factors of technology (e.g., social media) use by institutional actors in relation to embedded and established routines for innovation stages (e.g., ideation) in institutions.

In line with current studies, this review challenges researchers to explore policy void in industrialised and social contexts (Mehmood 2016; Onsongo 2019) and investigate the role of institutional mediators and factors (Laurell 2018; Tomizawa et al. 2020) in relation to institutional adaptation for regional innovations. There are also challenges to detangle institutional variations concerning how formal and informal institutions shape innovation types, practices, and processes (Chadee and Roxas 2013; Filiou and Golesorkhi 2016; Huang et al. 2017). Further challenges exist regarding the multi-faceted role of institutional environments that positively endorse and enable, or negatively inhibit and inactivate institutional innovations (Whitley 2000; Wang and Swanson 2007; Mueller et al. 2013; Wu et al. 2016; Fischer and Tello-Gamarra 2017; Nite and Washington 2017; Kadriu et al. 2019; Wu and Park 2019).

Derived from reflections on the management priorities of the previous section, the third path for future studies extends the synthesis from the review for *topical* viewpoints that strategically advance the field of institutional innovation. In the next subsections, we present these paths, detail current related efforts, and elaborate on some specific research challenges for management scholarship concerning institutional innovation.

6.1 Institutional contracting

The first challenge involves studies of institutional contracting (mainly from reflections on *NEER*) that examine the process of engagement, building relationships, and bargaining with contractors for formulating and implementing contracts. Accordingly, studies of institutional contracting advance *NEER* management, and in the proposed model of Fig. 5, *NEER* management maintains social exchanges within institutions in accordance with contingency, agency, and transaction cost theories. With increasing global trends towards privatisation, urbanisation, internationalisation, and digitalisation, the indications are that contracts remain crucial for maintaining transdisciplinary and interdisciplinary engagement within institutions. In current literature, new forms of contracts serve as the focus of innovation by agricultural institutions for contract farming (Escobal 2000; Bhanot et al. 2021) and supplier contracts with research institutions (Nordberg et al. 2003). There are also discussions on the value of smart contracts developed by financial institutions (Mishchenko et al. 2021). Although contracts are well-established as a form of institutional innovation (Polopolus 1969), studies on the nature of contracting remains limited. Therefore, we urge for research exploring the nature of contracting that enables institutional innovation and critical success factors of this contracting process. With evidence suggesting that contract enforcement challenges may cause the emergence of new institutions (Dimitri 2002), future research could theorise on and empirically investigate enforcement mechanisms for sourcing and contracting institutional innovation. Research also suggests that inadequate contracting processes account for several regulatory failures (Costa-Font and Puig-Junoy 2007), challenging future studies to expand on normative frameworks for contracting within institutions.

6.2 Institutional reimagining

The next challenge relates to research on institutional reimagining (from reflections on *ILCC*) to offer a critical view that complements existing analytical insights from studying opportunities and challenges of induced, continuous, and collective institutional innovation. Hence, research on institutional reimagining furthers *ILCC* management, and in the proposed model of Fig. 5, *ILCC* management involves coordinating capabilities under institutional constraints that reflect resource-based, dynamic capabilities, absorptive capacities, and institutional-pump framings. This coordination requires awareness and support for the construction of institutional narratives (Schofield 2000) and consciousness capabilities of new global imaginaries (Hughes et al. 2021). In furtherance of these efforts, we propose that researchers assess institutions critically on an on-going basis to promote transdisciplinary efforts that avert institutional stagnation when confronting societal challenges. With insights from the literature and in line with institutional theory, this review highlights the need for critical reflections on the measures and pressures that shape innovation success. Multi-level analysis could aid in uncovering the micro, meso, and macro levels that are critical to promoting

success and averting collapse of institutions. Critiques could also compare up-and-up and divide-and-conquer strategic plans to highlight instances of wasteful tax-and-spend policies.

Recognising the threat of institutional obsolescence discussed in early research (Polopolus 1969; Shaffer 1969), we also propose future research on the collapse of institutions, in the context of failed institutional logics for innovation to capture reasons, detail lessons learnt, review existing policy toolboxes, and reimagine failed institutions. For instance, the collapse of financial institutions in 2008 and economic collapse due to the COVID-19 are instances of institutional collapse with negative global consequences. Thus, this line of research could strive to analyse innovation determinants for recovery or reconstruction of institutions. Questions guiding such research efforts include 'how can governments innovatively reconstruct collapsed institutions?' and 'what structural and behavioural attributes contribute to the collapse of institutions?' Future research could also use insights from lessons learnt to provide innovative forecasting tools to avert institutional collapse.

6.3 Institutional intelligence

Another challenge for studies involves analysing institutional intelligence (from reflections on *ECPI*). Research concerning institutional intelligence encompasses assessments of the data analytic capacities (e.g. big data analytics (Yau and Lau 2018)) that harness the potentials of institutional information, and the intelligent intermediaries (Chen et al. 2015) that facilitate innovation, particularly in relation to recruiting, retaining, and developing intelligent employees. Consequently, institutional intelligence research advances *ECPI* management, which represents a fundamental component of the proposed multi-level management model, as represented by Fig. 5, and determines economic benefits from institutional innovation, in line with economic theory. Although, this review incorporates studies on the need to attract top talent for innovative research in higher education (Dahm et al. 2021) and innovation 'offshoring' to emerging countries (Desai 2009), this line of inquiry remains limited in the context of institutional innovation research. Accordingly, we challenge academia to explore the range of data analytics for institutional innovation further, along with concepts such as institutional optimisation, innovative talent capacity building, institutional intelligence, and talent management strategies. Studies may also consider intelligence and talent management in relation to roles of actors in constructs like the quadruple helix, and control mechanisms, e.g., managerial incentives and corporate governance. Since intelligence and talent are human capital constructs, there are questions concerning effectiveness of top-down and bottom-up strategies within institutions. Some questions include 'how effective is upper management in retaining talent for innovation?' and 'what is nature of team involvement in selecting and sourcing analytic capabilities for institutional innovation?'.

6.4 Institutional stewardship

For management researchers, there are future opportunities to examine institutional stewardship (mainly from reflections on *ISOG*). With emphasis on responsibility and accountability, stewardship progresses *ISOG* management and embodies the control and sense of duty demanded by on-going shifts from government to governance (Clapp et al. 2016) for boosting participation and empowerment for institutional innovation. *ISOG* management, in the proposed model of Fig. 5, involves governance that promotes pro-innovation institutions and is in line with agency and actor network theories. In this review, studies offer insights on related challenges for participatory governance (Forde 2020) and leadership (Williams 2002; Asiedu et al. 2020) that trend towards a sense of duty by institutional actors. Despite these research efforts, the literature provides limited bottom-up insights on the potential role of stewards in promoting institutional innovation and innovation contexts, i.e., organisational, environmental, social, and governmental. Future research could study specific roles of institutional stewards for radial and incremental innovations. Although, empirical evidence suggests links between stewardship behaviour and the success of innovation (Domínguez-Escrig et al. 2019), there are opportunities for studies to test this relationship in normative and cognitive institutional contexts. Future research may also view challenges of institutional stewardship in isolation or in conjunction with existing inadequacies due to institutional pressures, voids, and barriers.

6.5 Institutional preparedness

Another potential research direction involves studies of institutional preparedness (mainly from reflections on *TRTS*), in the context of more frequently occurring macroeconomic shocks and technological transformations in society that threaten the legitimacy of institutions. Traditionally a focus of studies on agents of change (Ebegbulem 1974), research on readiness in an institutional context increasingly focuses on preparedness that supports trajectories of self-propagating technologies (Nagamatsu et al. 2006). Institutional preparedness, in this context, refers to how institutions are equipped in terms of capabilities and capacities to respond to new challenges and opportunities. The proposed multi-level model of Fig. 5 advances *TRTS* management for technology readiness as an element of institutional preparedness, with conceptual underpinnings from contingency and diffusion theory. Yet, there remain challenges to understand future innovation contexts and preparedness by institutions for praxis and crisis situations, proactively and reactively. For instance, recent dengue, Zika, and coronavirus outbreaks have challenged the role of traditional innovation-driven approaches, which focus on opportunity, and shifted the attention to ingenuity to cope with adversity. In addition, there are challenges to examine the infusion and routinisation (beyond the adoption and diffusion foci of current research (e.g., Genus 2012; Oborn et al. 2021)) of technologies emerging due to the Fourth Industrial Revolution (e.g., synthetic data, biotechnology, and 3D printing). Thus, future studies may consider challenges such as institutional

roadmaps with foresights for emerging technologies and institutional skilling needs. Other investigations could consider preparedness constructs for innovative institutions and crisis-driven innovation contexts for institutions.

6.6 Institutional complementarities

The final challenge involves research on institutional complementarities (mainly from reflections on *ISIE*) for examining the ability of institutions to supplement other institutions in the quest for innovation, or the degree to which institutional arrangements, roles, factors, and innovation emphasise or improve each other. Just as innovation complements other explanations of economic growth (e.g., geography, and international trade), opportunities exist to investigate the complementarities for institutional innovation. For this reason, studies of institutional complementarities further *ISIE* management, and in the proposed model of Fig. 5, *ISIE* management ensures integration and incentivisation within institutions in accordance with resource-based and dynamic capabilities views. Discussions in the literature on compatibility and substitutability (Corsi and Prencipe 2019; Da Silva 2019) reinforce the role of strategies for complementarities in sustaining synergies and incentivising entrepreneurial ventures within institutions. Yet, questions remain on the scope, range, and forms of complementarities that facilitate institutional innovation. For instance, the prospect of 'creative complementarities' that supply creativity-driven resources and know-how (Durugbo et al. 2020a), suggests possibilities for implementation, adoption, and continuance forms of complementarities that incentivise induced, continuous, and collective institutional innovation. Lines of inquiry could examine the nature of complementarities that (dis)incentivise entrepreneurial endeavours within institutions. Such focus is needed because the literature in this review suggests that conflicting incentives within institutions inevitably deter innovative activities (Carney and Zheng 2009). Further studies could also examine institutional complementariness for innovation in the context of determinants such as quality, productivity, diversity, and so on. In addition, complementary viewpoints may consider and explore the role of complementarities in addressing challenges of inequality, sustainability, security etc.

7 Conclusions

In the words of Pablo Picasso, "learn the rules like a pro, so you can break them like an artist". This saying underscores the need for ingenuity and innovation by institutions, as the rules of societies or of organisations to deliver value for a range of stakeholders such as citizens, governmental agencies, customers, and industry. Additionally, innovation in an institutional milieu faces pressures, voids, and barriers that force institutions to shift from scalable efficiency to scalable learning in efforts to expand management strategy and policy horizons. Consequently, transdisciplinary insights on the key determinants and management priorities of institutional innovation are critical to cope with the inherent dynamic

nature and tension between institutional persistence and innovative practices. These determinants and priorities aid institutions deliver breakthrough processes and outcomes that require review on an on-going basis to update scholarship and practice. With this in mind, this review confronts the following research question: "What are the main determinants and management priorities of institutional innovation in the literature?" (*RQ*).

Driven by a systematic approach that seeks to address *RQ*, this review summarises its findings in a multi-level management model for institutional innovation in terms of innovation contexts, institutional determinants, and management priorities. Grounded on organisational, social, environmental, and governmental contexts for innovation, the review identified four key determinants concerning (i) innovation quality and control; (ii) institutional diversity and reputation; (iii) innovation value and output; and (iv) institutional reform and improvement. Similarly, the review captured six management priorities concerning network engagement, externalities, and relationships; institutional logic, capabilities, and constraints; economic conditions, policies, and intermediaries; institutional strategies, ownership, and governance; and technology readiness, transfer, and support; and institutional synergies, incentives, and entrepreneurship.

There are two main limitations of this review. First, the *review focus* is limited to capturing the main determinants and management priorities of institutional innovation. In this context, there is a need for additional insights on aspects such as innovation activities, the behaviour of institutional actors, and institutional arrangements. Second, the *review approach* is restricted to a systematic methodology that applies thematic analysis. Hence, there are prospects for deeper insights based on other review methodologies such as meta-analyses and meta-syntheses that offer more focused and extensive knowledge on constructs, dependencies, and links between variables within qualitative and quantitative studies of institutional innovation. Further analysis of co-citations could offer knowledge on the nature of citation dynamics and potential connections between publications.

Guided by insights from the findings on management priorities, the review identifies six strategic areas for future management research on institutional contracting, reimagining, intelligence, stewardship, preparedness, and complementarities. In summary, the review anticipates that the necessities and niceties of these proposed areas will aid in strengthening existing knowledge on institutional innovation and in uncovering new and exciting institutional phenomena, prospects, and potentials as managers set ground rules on contexts for innovation and run the rule over determinants within institutions.

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