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Towards a Theory of Serendipity: A Systematic Review and Conceptualization

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ABSTRACT Serendipity – the notion of making surprising and valuable discoveries – plays a major role in the success of individuals and organizations alike. Previous research has established the importance of serendipity and identified important individual- and organizational-level antecedents. However, the literature has been dispersed and the boundaries of the concept have been blurry, leading to a lack of conceptual clarity and structure, and thus limiting validity and managerial actionability. Based on a systematic literature review, I synthesize existing management-related research on serendipity and explicate the emergence and composition of serendipity in the organizational context. I first identify three necessary conditions that differentiate serendipity from related concepts such as luck or targeted innovation: *agency*, *surprise*, and *value*. Then, I draw from the literature on sensemaking, event-based theorizing, and quantum-based approaches to management to conceptualize the process of cultivating serendipity in the organizational context as a process of enabling *potentiality* and *materialization*, and develop a multi-level theory of (cultivating) serendipity. This conceptualization contributes to our collective understanding of how, why, and when (i.e., under what conditions) organizations can leverage the value in the unexpected, which opens up fruitful avenues for further research.

Keywords: chance, coincidence, discovery, fortune, happenstance, innovation, invention, luck, potentiality, possibilities, serendipity, uncertainty, unexpectedness

INTRODUCTION

> '*Humiliating to human pride as it may be, we must recognize that the advance and even the preservation of civilization are dependent upon a maximum of opportunity for accidents to happen*'.
> Friedrich August von Hayek, winner of the 1974 Nobel Prize in Economics

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Serendipity – the notion of making surprising and valuable discoveries – plays a major role for individuals and organizations alike (Denrell et al., 2003; Merton and Barber, 2004; Yaqub, 2018). Numerous innovations and inventions such as potato washing machines, Velcro, and Viagra can be traced back to serendipity, and many individuals and organizations credit it as essential to their success, allowing for unexpected new products and services, insights, and market spaces (Busch 2020; Cunha et al., 2015; Von Hippel and von Krogh, 2016).

Serendipity has been studied in diverse fields such as human-computer interaction (e.g., Gemmis et al., 2015; Murakami et al., 2007), library and information science (e.g., Agarwal, 2015; Foster and Ellis, 2014; Liu et al., 2022), and molecular chemistry (e.g., McNally et al., 2011; Pirnot et al., 2013). More recently, there has been a spike in interest in this topic in the field of management studies: for example, over 50 per cent of all serendipity-related papers that were published in the 50 leading management journals (FT50 journal list) emerged in the last five years (own analysis; see below). This recent research broadly contends that while serendipity is triggered by chance and inherently unpredictable, humans do have agency, and some individuals and organizations might be better equipped to handle the fluctuating conditions of today's business world than others – for instance, by integrating specific practices that improve their preparedness for making unplanned fortunate discoveries (Fultz and Hmieleski, 2021; Von Hippel and von Krogh, 2016).

Yet, research on serendipity has been largely phenomenological, missing a more cross-disciplinary, ontological inquiry into its composition, antecedents, and underlying dynamics; in short, we lack an understanding of the multi-level dynamics that constitute and enable (or inhibit) serendipity in the organizational context, and thus, an actionable and managerially relevant theory of (cultivating) serendipity (Busch and Grimes, 2023; Cunha and Berti, 2023; Stock-Homburg et al., 2021). Thus, I asked: *How, why, and when* (i.e., *under what conditions) does serendipity emerge in the organizational context, and how, why, and when can individuals and organizations enable (or constrain) this process?*

To answer this question, I embarked on a systematic literature review and screened the 50 journals that are broadly regarded as the leading journals in management for the search term 'serendipity'. I then 'snowballed' (Flick, 2009) to integrate seminal works from other sources. Based on a systematic screening of the literature, I synthesized the managerially relevant research on serendipity, and developed a multi-level theory of (cultivating) serendipity that captures how, why, and when serendipity can emerge and be facilitated in the organizational context.

As I will elaborate on further below, the systematic review surfaced three necessary conditions that differentiate serendipity from related concepts such as luck or targeted innovation – *agency*, *surprise*, and *value* – as well as essential individual- and organizational-level antecedents. I then drew from the literature on sensemaking (e.g., Thomas et al., 1993; Weick, 1995), event-based theorizing (e.g., Morgeson, 2005; Morgeson et al., 2015), and quantum-based approaches to management (e.g., Hahn and Knight, 2021; Lord et al., 2015) to conceptualize the process of *cultivating* serendipity in the organizational context as a multi-level process of enabling *potentiality* (creating a latent space of possibility

by increasing the likelihood of trigger events as well as of noticing and bracketing weak cues) and *materialization* (enacting specific possibilities).

I make two primary contributions. First, based on a systematic review of serendipity in the management context, I identified its composites, necessary conditions, and underlying dynamics, and thus provide conceptual clarity and structure in this domain. By synthesizing research that has conceptualized serendipity primarily as either a process (e.g., Denrell et al., 2003) or an outcome (e.g., Yaqub, 2018), I contribute to the emerging literature on serendipity in management studies (e.g., Cunha et al., 2010; Fultz and Hmieleski, 2021) a clear definition and demarcation of serendipity. Based on the three necessary conditions that I derived from the review (*agency*, *surprise*, and *value*), I define serendipity as 'surprising discovery that results from unplanned moments in which our decisions and actions lead to valuable outcomes'. This concise demarcation of serendipity allows for a clear-cut differentiation from related concepts such as targeted innovation or luck, and thus helps provide conceptual clarity (Busch and Grimes, 2023; Stock-Homburg et al., 2021). I contend that 'unblurring' the boundaries of serendipity and conceptualizing it in the organizational context makes the concept easier to capture and leverage for researchers and practitioners alike.

Second, as outlined above, I integrated event-based theorizing, sensemaking, and quantum-based approaches to management to develop a multi-level conceptualization of *cultivating serendipity* that captures how, why, and when serendipity evolves in the organizational context. I define *cultivating serendipity* as 'facilitating an interplay between unplanned events, individual effort, and organizational enablers and constraints that allows for surprising and valuable discoveries to emerge'. Building on prior research (e.g., Cunha et al., 2010; Denrell et al., 2003) that has contended that factors such as alertness, curiosity, and more, can positively influence the likelihood of serendipity to occur, this theoretical framework captures the possible multiple (multi-level) configurations that combine catalysts, enablers, and inhibitors on the individual and organizational level. This allows for understanding how, why, and when organizations can leverage the value in the unexpected (Cunha et al., 2010; Cunha et al., 2015).

Thus, by focusing on the mechanisms for cultivating serendipity, this work makes it easier for organizations to leverage serendipity in ways that may create tangible value, for example, through (serendipitous) innovation in processes, products, and services.

SERENDIPITY IN THE ORGANIZATIONAL CONTEXT

The earliest reference of the term serendipity goes back to Horace Walpole, who in 1754 in a letter to his friend Horace Mann referenced the fairy tale of the *Three Princes of Serendip*, coining serendipity as 'making discoveries, by accidents and sagacity, of things they were not in quest of' (Merton and Barber, 2004, p. 2). Prior management-related research in this domain can be categorized into papers with a primary focus on individuals (e.g., Austin et al., 2012; Engel et al., 2017; Lane et al., 2021), and papers with a primary focus on the organizational conditions that can enable or constrain serendipity (e.g., Busch and Barkema, 2022a; Fultz and Hmieleski, 2021; Garud et al., 2011; Graebner, 2004).

Papers focused on individual-level dynamics have shown that factors such as sagacity (i.e., mental discernment to make sense of information; e.g., Merton and Barber, 2004), prior knowledge and experiences (e.g., Austin et al., 2012), and intuition (i.e., a way of processing information that is fast and unconscious; Baldacchino et al., 2015) can facilitate serendipity, as they allow individuals to identify and leverage weak cues (Busch and Grimes, 2023). Regarding organizational-level dynamics, prior research has identified factors such as effective problem formulation (e.g., Von Hippel and von Krogh, 2016), interactions among employees (e.g., Garud et al., 2011), and resourcing unexpectedly emerging ideas (e.g., Busch and Barkema, 2022a) that can make it more (or less) likely for serendipity to emerge in an organizational context.

While these two streams have provided important insights, research on serendipity in management studies has been largely phenomenological and dispersed, missing a more cross-disciplinary, ontological inquiry into its composites and underlying dynamics (Busch and Grimes, 2023; Stock-Homburg et al., 2021). Thus, to synthesize these streams and to provide conceptual clarity and structure regarding the composites and underlying dynamics of serendipity, I embarked on a systematic literature review.

REVIEW SCOPE AND APPROACH

Following a systematic review approach (Stephan et al., 2016; Tranfield et al., 2003), I first searched the *Scopus* database to capture relevant papers that included the term *serendipity* in the abstract, heading, or keywords. I used the FT50 journal list to identify the 50 management-related journals that are commonly regarded as 'leading', and focused the initial search on papers that were published in these journals.[1] I included all papers that were published before May 2021. Table I provides an overview of the 24 papers that resulted from this initial screening, which I analysed for key demarcations and insights related to serendipity.

As a next step, I studied works (including books and book chapters) that were meaningfully discussed in the above-mentioned papers; i.e., that were not merely cited but that provided meaningful contributions (which I defined as 'adding a new perspective to the serendipity conversation'; e.g., Cunha et al., 2010; Cunha et al., 2015; Garud et al., 2018; Makri and Blandford, 2012a; Merton and Barber, 2004; Napier and Vuong, 2013, among others). I used two inclusion criteria (see, Stephan et al., 2016): (1) *Does the paper focus on serendipity as a key idea?*; (2) *Does this paper contribute a new perspective?* I analysed the papers based on their respective definition/demarcation of serendipity; their primary focus; and their key insights/themes related to serendipity. The iterative coding process (Stephan et al., 2016) surfaced three necessary conditions of serendipity: *agency*, *surprise*, and *value*. Figure 1 shows the coding structure, and how I clustered terms used in prior research into overarching concepts (see below for more details).

I took these insights from the serendipity-related literature as a starting point, and used three approaches to theoretically sensitize the emerging definition and conceptualization of serendipity in the organizational context: sensemaking approaches (e.g., Thomas et al., 1993; Weick et al., 2005) helped me to better understand the cognitive dynamics

Table I. Serendipity in top management journals (FT 50)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Andriani and Kaminska (2021)	Research Policy	3	Finding-B-whilst-looking-for-A.	Product innovation	Serendipity as the result of multiple stochastic elements that intervene at different points: a) emergence and observation (or not) of unexpected effect; b) availability of prior knowledge enabling gate crossing; c) conversion of affordances into functionality; d) existence or not of need satisfiable by emergent functionality, none of which can be fully anticipated.
Andriani et al. (2017)	Organization Science	23	Acting on existing entities by revealing some unforeseen possibilities and connections hidden in them as they become exposed to new contexts.	Product innovation	Serendipity uncovers potential exaptations. Thus, a measure of exaptation is also indirectly a measure of serendipity in innovation. While serendipity is not intentional, policy makers and organizations may implement processes that favour 'the prepared mind.'
Austin et al. (2012)	Organization Science	76	Serendipitous discoveries happen when the purposeful search encounters contingency in the presence of prior knowledge ('sagacity', or the 'prepared mind') as well as seeking out contingency.	Makers	'Makers' can organize their prior knowledge randomly to force themselves to traverse a lot of it often. Thus, they can make prior knowledge more available. Sagacity, a prepared mind, thus not only emerges due to prior knowledge but also via intentionally accidental arrangements. Expertise, techniques, and technologies can help makers manage the costs of inefficient search and arrangement of stored ideas. Openness to accident may be especially salient in early stages in a product life cycle, when costs of unproductive accidents can be more easily controlled, or later in such life cycles when novelty might be particularly valuable (e.g., when a breakthrough is needed). Conduciveness to innovation and openness to accident thus wax and wane at different stages of the innovation process and/or product/service life cycle.
Baba and Ace (1989)	Human Relations	15	Serendipity as unexpected discovery.	Students	Teaching style serendipitously emerged as being related to leadership style.

(Continues)

Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Banerjee et al. (2016)	Operations Research	10	Serendipity as unexpected discovery.	Recommendation systems	Serendipity is important for exploration and for how recommendation improves when an access graph has higher expansion.
Busch and Barkema (2022a)	Entrepreneurship Theory & Practice	16	Making discoveries, by accidents and sagacity, of things they were not in quest of (Merton and Barber, 2004, p. 2).	Incubator/ organizational practices	Serendipity is not only an 'accidental discovery' but is also related to being observant, building on the notion that discoveries are facilitated by controllable elements such as an open mind. In high-uncertainty contexts, a social structure that allows for flexibility can provide the conditions under which unexpected discoveries are enabled, facilitating opportunity-inducing networks.
Denrell et al. (2003)	Strategic Management Journal	326	Serendipity as effort and luck joined by alertness and flexibility.	Organization	The character of strategic opportunity implies that the process is likely to have been serendipitous. Success is a consequence of effort and luck joined by alertness and flexibility, where the effort was not initially directed to the specific end realized, alertness is required to recognize the lucky appearance of a new possibility, and flexibility is displayed in redirecting the effort. While good luck may befall the inert or lazy, serendipitous discovery occurs only in the course of an energetic quest in which lucky discoveries of an unanticipated kind can be recognized through alertness and then flexibly exploited.

Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Dew (2009)	Organization Studies	118	Search leading to unintended discovery.	Entrepreneurs	A theory of entrepreneurship is likely to be incomplete without the concept of serendipity. Serendipity is conceptualized as the combination of search (directed effort), contingency (favourable accidents), and prior knowledge (sagacity). Entrepreneurs may be able to engage in social networking behaviours that make it more likely that contingencies happen to them, i.e., they may deliberately engage in behaviours that part-endogenize favourable accidents.
Eagle (2004)	Sloan Management Review	30	Chance encounters among people who do not but should know each other.	Individuals	Serendipitous encounters can be enabled via technology platforms.
Engel et al. (2017)	Journal of Business Venturing	85	Search leading to unintended discovery (Dew 2009, p. 735).	Entrepreneur	Entrepreneurial networking requires an openness to unexpected contingencies, as networking activities stimulate serendipitous goal formation and transformation. A dynamic process model of entrepreneurial networking specifically addresses situations where goal-directed approaches are not an option, i.e., situations that are ubiquitous in entrepreneurship. Under uncertainty, effectual networking changes the portfolio of ties who commit to co-create the venture, thereby generating unexpected contingencies and enabling the serendipitous emergence of new entrepreneurial goals.

(Continues)

Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Fultz and Hmieleski (2021)	Journal of Business Venturing	2	Unexpected discovery of opportunity brought about by purposeful action.	Organizational practices	Organizational improvisation engenders the occurrence of serendipity. Improvisation is indirectly related to new venture performance via serendipity, contingent on a venture's level of resource constraints and informal organizational structure. The association of improvisation with serendipity is greatest when resource constraints are high; serendipity is positively related to new venture performance when informal organizational structure is high.
Garud et al. (2011)	Organization Studies	136	Serendipity can neither be predicted nor willed a priori, but requires prior engagement, a paradox captured by Pasteur when he observed that 'chance favours only the prepared mind'.	Organizational practices	Company practices can encourage employees to cultivate events driven by serendipity even as they pay attention to events driven by schedules. Possibilities for creating opportune moments are enhanced by practices that foster ongoing interactions between employees. Serendipity is a part and parcel of engaged and informed work, during which employees experiment with what they are doing, and in the process generate new insights. Inventions that emerge during serendipitous moments can accumulate and be maintained in technology platforms to become solutions to problems in the future. Consequently, even ideas labelled as 'mistakes' in real time can play a role in generating serendipitous discoveries in the future.

Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Godoe (2000)	Research Policy	92	Serendipity as process for creating new knowledge.	Product innovation	The lack of theoretical understanding reflected in innovation theories that attribute radical innovations to various form of serendipity aggravates the information problem that often confronts policy-making: If radical innovations are outcomes of unpredictable 'mutations', it is difficult to justify allocations to these purposes. However, by understanding the role of a strong innovation regime, this may possibly serve as a model for making R&D and technology policy more rational and meaningful.
Graebner (2004)	Strategic Management Journal	349	Serendipitous value as windfalls that were not anticipated by a buyer prior to a deal.	Technology acquisitions/ organization	Serendipitous value emerges from opportunities to discover new paths to creating value. Serendipitous value is created when acquired personnel take on cross- organizational responsibilities that encompass both the acquired and acquiring firms. In these cross-organizational roles, acquired leaders have the visibility to discover unexpected synergies as well as the status to bring these synergies to fruition.
Hemingway and Starkey (2018)	Journal of Business Ethics	8	Unanticipated finding.	Individuals/life stories	Particular research subjects emerged serendipitously from the authors' investigation into how values are being practiced in organizations.

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Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Irving et al. (2020)	Organization Studies	18	Serendipity – defined as a 'search, with unintended discovery' (Dew, 2009, p. 735) – relates to the combination of prior knowledge, purposeful action, and favourable accident that facilitates new discoveries.	Employees	Employees can avoid collaboration by minimizing serendipitous encounters. The authors use the term 'serendipitous encounter' rather than 'chance encounter' to express that employees can avoid encounters in a building not only by minimizing chance (encounters), but also by reducing other elements of serendipity (i.e., search, flexibility, and the obligation to interact). Mechanisms to avoid serendipity include reducing openness to chance, avoiding searching for collaborators from other groups in the building, minimizing flexibility, and minimizing social interactions.
Kim et al. (2021)	Journal of Marketing	0	An unexpected event that occurs when the consumer is in either a passive state, not trying to discover anything, or an active state, trying to find something of value.	Consumers/ marketplace interactions	Feelings of serendipity positively influence an array of consumer outcomes, including satisfaction and enjoyment, perceptions of meaningfulness of an experience, likelihood of recommending a company, and likelihood of purchasing additional products from the company. Strategies based on serendipity are more effective when consumers perceive that randomness played a role in how an encounter occurred, and not effective when the encounter is negative, the encounter occurs deterministically (i.e., planned by marketers to target consumers), and consumers perceive that they have enough knowledge to make their own choices. This suggests that marketers can influence customer satisfaction by structuring marketplace encounters to appear more serendipitous, as opposed to expected or entirely chosen by the consumer.

Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Lane et al. (2021)	Strategic Management Journal	1	Chance encounters.	Individuals	There are both cooperative and competitive effects of serendipitous knowledge sharing encounters on knowledge production. On the one hand, knowledge sharing can lead to greater knowledge transfer and knowledge creation when people have some overlapping intellectual and field interests, respectively. On the other hand, knowledge sharing reduces knowledge diffusion between people from the same field. 'Engineering serendipity' can promote greater knowledge sharing and more efficient knowledge production. Engineered serendipitous encounters differ from traditional knowledge production mechanisms because they give people a common time and space to meet, thereby removing some of the search costs associated with finding suitable knowledge sharing partners.
Murayama et al. (2015)	Research Policy	28	The act of finding answers to questions not yet posed.	Individuals	Serendipity is a key feature of science not only in great discoveries but also in science in general, and on average, serendipity brings about better research quality. This finding suggests the importance of a management that gives scientists the flexibility to pursue a serendipitous finding when they face the unintended and unexpected. Also, the integration of a managerial role with a leading research role has a positive effect on serendipity. There is a trade-off between pursuing serendipity and achieving research efficiency in science (contingent on who plays the managerial role and who the leading research role).

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Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Rauch and Ansari (2021)	Journal of Management Studies	2	'Search, with unintended discovery' (Dew, 2009, p. 735), the 'distinct capability, namely that of recombining any number of observations… that appear to be meaningfully related' (Liu and de Rond, 2016, p. 434).	Platform innovation	Serendipity requires prior experience, previous skills, a 'prepared mind' and purposeful action, but also favourable accidents that facilitate discoveries. In this case, core team members' previous work in medical contexts had primed them for such developments. Serendipitous inspiration also plays a central role in enabling change, helping actors to recognize the respective discovery's potential and ensuring that it could benefit more people in need. Serendipitous inspiration is necessary for recognizing alternatives and options, and to trigger innovative behaviours that deviate from established paths (e.g., academic research). Serendipitous inspiration is thus salient for innovation. However, frame shifts towards responsible innovation may not always require serendipity, and may be achieved through deliberate planning. Also, managers may be reluctant to admit serendipity, preferring to credit their deliberate strategies rather than 'luck.'
Sampat (2012)	Research Policy	34	Unplanned or unexpected outcomes.	Organizational processes	Over the long run, the serendipity hypothesis (i.e., that much progress against specific diseases results from unplanned research, or unexpectedly from research oriented towards different diseases) appears to have been persuasive in convincing Congress and taxpayers that the dichotomy between health and science is a false one: that the best route to improved health is fundamental science.

Table I. (Continued)

Authors	*Journal*	*Scopus citations (15 May 2021)*	*Definition/demarcation of serendipity*	*Primary focus*	*Key insights/themes related to serendipity*
Winter (2012)	Organization Science	27	Serendipity as effort and luck joined by alertness and flexibility (Denrell et al., 2003).	Organization	The behavioural theory of strategy (e.g., Gavetti, 2012) focuses on cognitive aspects of strategy but provides little guidance for understanding the achievement of success partly because it underestimates the role of serendipity, and that the process by which strategic opportunity is discovered is typically serendipitous. Success is a consequence of effort and luck joined by alertness and flexibility, where the effort was not initially directed to the specific end realized, alertness is required to recognize the lucky appearance of a new possibility, and flexibility is displayed in redirecting the effort (also see Denrell et al., 2003).
Yaqub (2018)	Research Policy	44	The notion of people making unexpected and beneficial discoveries.	Individual	Identifies four types of serendipity (Walpolian, Mertonian, Bushian, Stephanian) as well as four mechanisms of serendipity (theory-led, observer-led, error-borne, network-emergent).
Yi et al. (2017)	Information Systems Research	26	'Perceived serendipity': the extent to which a user believes that a website helps them to discover useful products beyond their original expectation in a search process.	User	The integration of product tags and access to socially endorsed people enables users to conduct more serendipitous searches. In addition, 'perceived serendipity' of a search experience positively affects users' decision satisfaction.

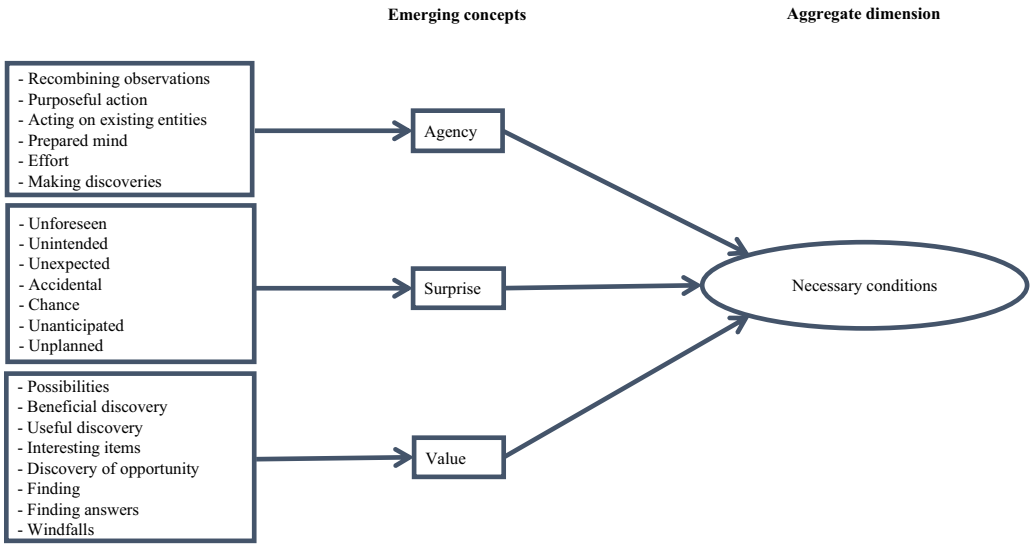


Figure 1. Coding structure: Necessary conditions of serendipity [Colour figure can be viewed at wileyonlinelibrary.com]

underlying the serendipity process; quantum approaches to management (e.g., Hahn and Knight, 2021; Lord et al., 2015) allowed me to capture the logic of 'potentiality', and how possibilities can materialize into serendipitous outcomes[2]; and event-based theorizing (e.g., Morgeson, 2005; Morgeson et al., 2015) helped me to demarcate relevant boundary conditions, in particular, related to 'surprise'.

As a next step, I screened the literature for the antecedents of serendipity on both the individual and organizational level, and clustered emerging themes around individual-level catalysts (*detection qualities* and *linking qualities*); individual-level enablers and inhibitors (*enabling qualities* and *inhibiting qualities*); and organization-level enablers and inhibitors (*social integration mechanisms* and *resource integration mechanisms*) that can directly or indirectly influence the emergence of serendipity. Figure 2 shows the coding structure.

As a final step, I integrated these antecedents into a conceptual model, and demarcated *cultivating serendipity* as a multi-level process of enabling *potentiality* and *materialization* (see below).

DEMARCATING SERENDIPITY

Over the last few years, there has been an increased interest in the role of serendipity in management studies, with over 70 per cent of serendipity-related articles in the Financial Times 50 top management journals being published in the last 10 years, and over 50 per cent in the last five years (see Table I). My systematic review of the literature surfaced the three necessary conditions of serendipity that later laid the foundation for a definition and conceptualization of serendipity.

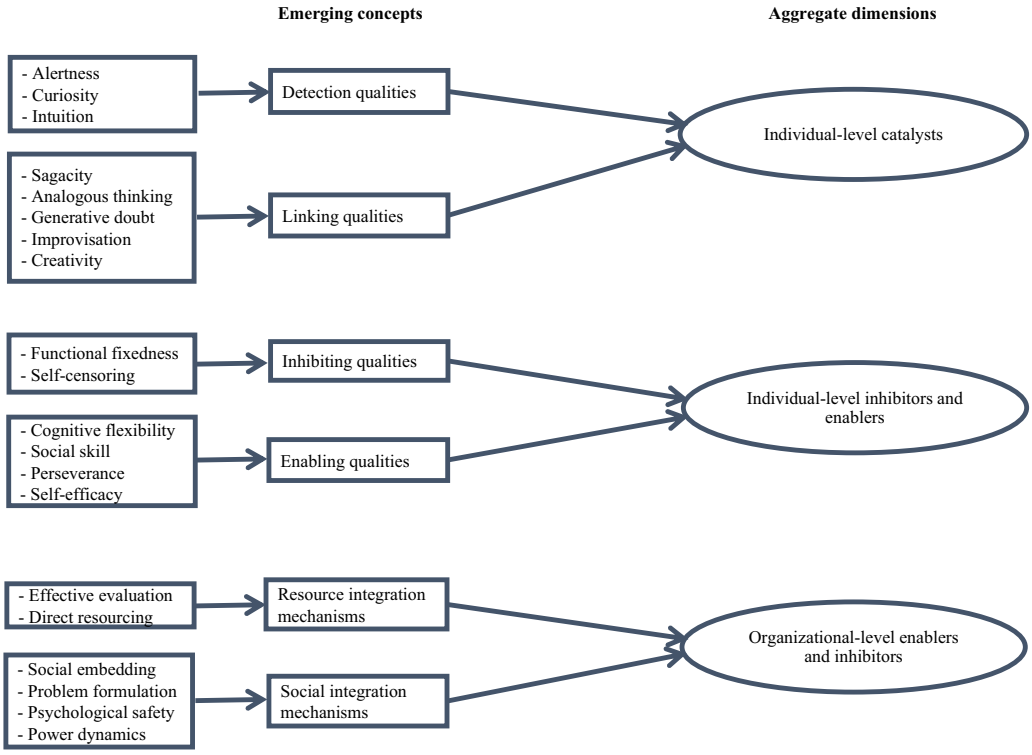


Figure 2. Coding structure: Antecedents [Colour figure can be viewed at wileyonlinelibrary.com]

Necessary Conditions

Based on a systematic literature review, I identified three necessary conditions of serendipity (see Figure 1): *agency*, *surprise*, and *value*.

Agency. While there has been an array of definitions, prior research in management studies and related fields generally captures serendipity as an interaction of chance and individual action (e.g., Cunha et al., 2010; Cunha et al., 2015; Denrell et al., 2003; Dew, 2009; Erdelez and Makri, 2020). Thus, while serendipity is based on chance, social actors can gain some influence over outcomes (Busch and Barkema, 2022a; de Rond, 2014; Fultz and Hmieleski, 2021; Rauch and Ansari, 2021). Prior research has discussed the importance of 'acting on' existing entities (e.g., Andriani et al., 2017); 'grasping possibilities' (e.g., Björneborn, 2020); 'recombining any number of observations' (e.g., Rauch and Ansari, 2021); a 'prepared mind' (e.g., Austin et al., 2012; Garud et al., 2011); 'effort' (e.g., Denrell et al., 2003; Winter, 2012); 'making discoveries' (e.g., Busch and Barkema, 2022a; Merton and Barber, 2004; Yaqub, 2018); and 'purposeful action' (e.g., Fultz and Hmieleski, 2021; Irvin et al., 2020). I capture these human-driven actions and interventions that help generate serendipity as *agency*.

Surprise. Prior research highlights serendipity as being 'unforeseen' (e.g., Andriani et al., 2017); 'unintended' (e.g., Rauch and Ansari, 2021; Dew, 2009; Engel et al., 2017;

Irving et al., 2020); 'unexpected' (e.g., Baba and Ace, 1989; Banerjee et al., 2016; Fultz and Hmieleski, 2021; Kim et al., 2021; Yaqub, 2018); 'accidental' (e.g., Busch and Barkema, 2022a; Merton and Barber, 2004); 'chance' (e.g., Garud et al., 2011; Lane et al., 2021); 'unanticipated' (e.g., Graebner, 2004; Hemingway and Starkey, 2018); and 'unplanned' (e.g., Björneborn, 2017; Sampat, 2012). Thus, serendipity is based on something unexpected, unplanned, or unusual (i.e., it comes *by surprise*; Busch, 2020; Shani and Gunawardana, 2011). I demarcate this element as *surprise*, which captures both the objective (or at least inter-subjective) dynamic of an unplanned event, as well as a social actor's perception of something unexpected that causes them to experience (mild) astonishment (as I discuss below, serendipity is in the eye of the beholder).

Value. The literature has captured the emergence of serendipity as unforeseen 'possibilities' (e.g., Andriani et al., 2017); unintended or unexpected 'discovery' (e.g., Baba and Ace, 1989; Banerjee et al., 2016; Dew, 2009; Engel et al., 2017; Rauch and Ansari, 2021); 'finding answers' (e.g., Murayama et al., 2015); 'discovery of opportunity' (e.g., Fultz and Hmieleski, 2021); 'windfalls' (e.g., Graebner, 2004); 'beneficial discoveries' (e.g., Yaqub, 2018); 'useful discovery' (e.g., Yi et al., 2017); 'surprisingly interesting items' (e.g., Gemmis et al. 2015; Herlocker et al. 2004); 'novel possibility' (e.g., Herlocker et al., 2004); and 'positive surprise' (e.g., Adamopoulos and Tuzhilin, 2015). I clustered these items that refer to some sort of 'relative worth' as *value*. 'Value' tends to be in the eye of the beholder, and it can become apparent in the moment the connection is made, or at a later stage (e.g., once a learning outcome manifests) (Makri and Blandford, 2012b; McCay-Peet and Toms, 2015). (Perceived) value can change over time, it can be elusive (e.g., if something is merely 'interesting' without providing immediate tangible benefits), and importantly, what might be beneficial for some might not be beneficial for others (Makri and Blandford, 2012b). Organizations can help social actors interpret which unexpected observations might be meaningful in the respective context, and thus, provide an inter-subjective interpretation of value (Busch, 2020; see Schwandt, 2017; Weick, 1995).

These three necessary conditions of serendipity – *agency*, *surprise*, and *value* – laid the foundation for my definition and conceptualization of serendipity.

DEFINING AND CONCEPTUALIZING SERENDIPITY

The management-related literature on serendipity tends to primarily conceptualize it as either a process (e.g., Denrell et al., 2003), an outcome (e.g., Yaqub, 2018), or both (e.g., Busch, 2020; Fultz and Hmieleski, 2021). Denrell et al. (2003), for instance, captured serendipity as 'effort and luck joined by alertness and flexibility', i.e., a process that precedes unexpected discovery. Yaqub (2018), in turn, conceptualized serendipity as unexpected discovery, i.e., an outcome. I synthesize these perspectives, and based on the three conditions derived above (*agency*, *surprise*, and *value*) define serendipity as 'surprising discovery that results from unplanned moments in which our decisions and actions lead to valuable outcomes'.[3] Anchored in these conditions and related work (e.g., Busch, 2020; Busch and Barkema, 2022a), I conceptualize serendipity as a

process and related outcome rather than a singular event: as I discuss in more detail below, in a given situation, there is the occurrence of a *serendipity trigger* (an *unplanned* moment, e.g., unexpected event/information); an *association* is being made, wherein social actors imbue meaning in the unexpected event (de Rond, 2014; i.e., requiring *agency*); and, in an organizational context, there is the *materialization* – the enactment of a specific possibility – that turns it into an unanticipated and worthwhile (i.e., *valuable*) outcome.

I will now discuss these building blocks and their interrelationships.

Conceptualizing Serendipity in the Organizational Context

Serendipity is anchored in context (Makri and Blandford, 2012a). Social actors that encounter serendipity can vary in their initial intent and motivation (e.g., they might be looking for something already; or have a specific problem that they aim to solve; or might not be looking for anything at all; Busch, 2020; Fultz and Hmieleski, 2021; Yaqub, 2018), as well as their respective task environment (Makri and Blandford, 2012a). This informs their experience of serendipity, for example regarding the degree of *surprise* (see, e.g., Bogers and Björneborn, 2013) that they experience.

Serendipity trigger. Serendipity is activated when a person encounters something unexpected, unplanned, or unusual (i.e., by different degrees of *surprise*; Björneborn, 2017; Busch, 2020). Often, these events or pieces of information are not noticeable to most people – they might be a weak cue, such as a subtle verbal, textual, or visual prompt (McCay-Peet and Toms, 2015; Merton and Barber, 2004; Weick, 1995). As I discuss in more detail below ('boundary conditions'), events are bound by space and time, and vary in terms of their strength (i.e., how novel, disruptive, and critical they are; Ballinger and Rockmann, 2010; Morgeson and DeRue, 2006; Morgeson et al., 2015).

Association. Noticing relevant unexpected events/information is not enough; social actors need to imbue meaning in context (de Rond, 2014). The attribution of 'quality' to unexpected information or events tends to be socially constructed (Elsbach and Kramer, 2003; Lu et al., 2019), such that new information is noticed and deemed meaningful precisely because it is socially contextualized (Busch and Grimes, 2022; Weick et al., 2005; Weick and Sutcliffe, 2011). Thus, serendipity requires not only the noticing but also the bracketing of weak cues (de Rond, 2014; also see Weick et al., 2005) and relies on some sort of *association*, i.e., the forming of mental connections between sensations, ideas, or memories (Busch, 2020; de Rond and Morley, 2010; McCay-Peet and Toms, 2010). (Anchored in the work of Koestler (1964) and others, the literature has sometimes used the term 'bi-sociation' to indicate that serendipity often emerges from the simultaneous mental association of an idea or object with fields ordinarily not regarded as related; I use the term 'association' in the broadest sense of the word – as the forming of mental connections – which captures 'pairs' as well as whole configurations of connections).

The relevance of unexpected events or information is often only understood when insights from other areas help identify their broader relevance, and serendipity often relies on metaphorical leaps, such as the realization that the apple falling from the tree is not only about the apple itself, but instead might represent gravity's pull on any object on earth (Busch, 2020; Cunha et al., 2010). There can be a time lag ('incubation time') that allows individuals to realize the significance of a serendipity trigger (Makri and Blandford, 2012b; McCay-Peet and Toms, 2015).[4] Notwithstanding the duration of the process, this 'contingent mix of insight coupled with chance' (Fine and Deegan, 1996, p. 436) is rooted in social actors' decisions and actions (i.e., *agency*).

Depending on the situation, an unplanned event may activate a cloud of possibilities constituted by problems, solutions, and unexpected events, allowing for potential problem/solution combinations (i.e., relevant associations) to emerge (see, Von Hippel and von Krogh, 2016). I conceptualize these theoretically possible associations as a latent space of possibility that I refer to as *potentiality*, i.e., indeterminate potential that is both inherent and socially constructed (see, Hahn and Knight, 2021; see below). This potentiality arises from the innate characteristics of individuals, organizations, and their interactions with their environment (Cameron and Quinn, 1988).

Materialization. Even if social actors recognize and bracket weak cues, they need to (be able to) put the potential serendipitous opportunity into effect (i.e., enact it) in the organizational context (Ross, 2023; also see Cohen and Levinthal, 1994; Thomas et al., 1993; Weick, 1995; Zahra and George, 2002). I theorize that the cloud of possibilities constituted by problems, solutions, and random events is 'fixed' into a specific *materialization* opportunity by the specific socio-material context that represents the organizational 'apparatus' (Barad, 2003; Hahn and Knight, 2021).[5] This apparatus – which can consist of mental templates (Miron-Spektor et al., 2018), socio-discursive processes (Putnam et al., 2016), environmental factors (Smith and Lewis, 2011), and material underpinnings and artefacts (Schad and Bansal, 2018) – serves as a lens to recognize specific incidences and also shapes the probabilities of spotting and enacting these (Barad, 2003; Hahn and Knight, 2021). This enactment of the respective association in the organizational context gives rise (and constraints) to future potential states and possibilities, as particular choices tend to spur new (interconnected) issues and conversations (Hahn and Knight, 2021; Lord et al., 2015). Hence, *potentiality* and *materialization* are mutually constituted. Importantly, the organizational apparatus is part of a broader set of contextual factors, and possibilities often require 'felicitous circumstances' to materialize (also see Austin, 1962; Butler, 2010).

By definition, the unexpected *valuable* outcome – for example, a particular innovation, a new solution, or a new way of doing something – as well as when exactly it occurs, is unknowable (and thus unpredictable) a priori (see, Björneborn, 2020). And while serendipitous outcomes can relate to intangible (e.g., social or cognitive) or tangible factors (e.g., physical production of a prototype), for a serendipitous innovation to succeed it often needs to be more broadly adopted (Hargadon and Douglas, 2001). For example, the porn industry became a key factor in determining the dominance of a particular videorecording standard (VHS), a serendipitous occurrence for its creator, JVC.[6]

Figure 3 captures this process: Serendipity emerges when in a given *situation*, a *serendipity trigger* is being spotted (Busch, 2020; Busch and Grimes, 2023); individuals act on this trigger, for example, by relating an unexpected observation to an organization's goal or identity (*association*; c.f., Cunha et al., 2010; de Rond, 2014; also see Thomas et al., 1993; Weick, 1995). All potential associations ('connections between dots') that are theoretically possible form a latent space of possibility (*potentiality*). To lead to a valuable outcome in an organizational context, latent value needs to be realized (Busch and Barkema, 2022a). Thus, the potential infiniteness of possibilities 'collapses' into a concrete *materialization*, which in itself opens up new (infinite) latent possibilities (*potentiality*). The organizational apparatus provides the conditions that can enable or constrain these dynamics, which – in different shapes and forms – can unfold and repeat indefinitely so long as a system evolves (also see Hahn and Knight, 2021). While for illustrative purposes I depict the serendipity process as linear, *trigger* and *association* might happen simultaneously or draw out over time (*incubation time*; e.g., Busch, 2020; Cunha and Berti, 2023).

The example of the potato washing machine (own research) illustrates this dynamic: When farmers unexpectedly reported that their washing machines had broken down due to them washing their potatoes in it (*serendipity trigger*), employees of a white goods manufacturer realized that this might be a market opportunity for potato washing machines (*association*). The organization invested into the idea, integrated a dirt filter, and turned it into a concrete new product (*materialization*). This example shows how *potentiality* can emerge in an organizational context, and how it can be *materialized*, turning random observations into beneficial results.

As discussed above, the random event (here: farmers calling the company) can activate numerous potential problem/solution combinations (see, Von Hippel and von Krogh, 2016). The specific association that was materialized here was the potato washing machine, but the same problem could have been solved in many other ways, for example by developing another product that does not resemble a washing machine. Alternatively, the company could have used the unexpected event to realize a completely new problem/solution combination.

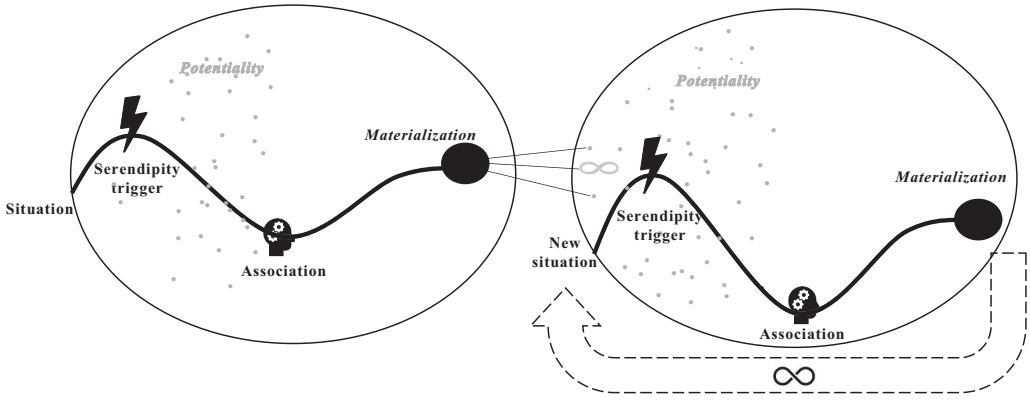


Figure 3. Conceptualizing serendipity in the organizational context. Serendipity trigger and association can occur at the same time or draw out over time (Busch, 2020). The exact manifestations (i.e., shape and form) of the process depend on the context; this figure captures two (out of a potentially infinite number of) different options

While the discussion above captures the process (and related outcomes) of serendipity, the review surfaced different 'types' of serendipity, which I differentiated based on the three necessary conditions identified above.

Types of Serendipity

Prior research in organization and management studies has attempted to categorize different types of serendipity (e.g., Busch, 2020; de Rond, 2014; Yaqub, 2018). These categorizations tend to focus on (a) the initial intent of the relevant social actor(s) and/or (b) the outcomes of the discovery process. Yaqub (2018) derived four serendipity 'types', structured into a two-by-two matrix: 'searching with a defined problem in mind/searching with no particular problem in mind' and 'solution to a given problem/solution to a different problem'. Busch (2020) derived three types of serendipity based on 'are you looking for something already [yes/no]' and 'did you find what you were looking for [e.g., in unexpected ways], or did you find something entirely unexpected'. Björneborn (2017) and Bogers and Björneborn (2013) differentiated between 'foreground serendipity' (confirming a person's immediate focus or direction; e.g., the discovery of penicillin) and 'background serendipity' (possibly changing a person's immediate focus and direction), depending on whether preoccupations/foreground interests or background/latent interests are triggered. In turn, research in areas such as human-computer interaction in recommender systems tends to focus on the qualities of the phenomenon itself, such as usefulness and interestingness (e.g., Adamopoulos and Tuzhilin, 2015; Gemmis et al., 2015; Murakami et al., 2007).

I synthesize these literatures and locate serendipity on a continuum from 'weak' to 'strong,' based on the three necessary conditions *agency*, *value* (satisficing threshold level), and (degree of) *surprise*. Drawing from event-based theorizing (Morgeson, 2005; Morgeson et al., 2015), I characterize the *degree of surprise* based on *event strength*, that is, how different (in terms of novelty, disruption, and criticalness; Morgeson et al., 2015) the unexpected discovery is from the social actor's initial *situation*, as well as their interpretation of it. Importantly, 'surprise' is in the eye of the beholder, and what might be new to the respective social actor might not be new to the world (Bogers and Björneborn, 2013; Felin and Zenger, 2015; Makri and Blandford, 2012a).[7]

However, serendipity happens in context; therefore, below I discuss the antecedents of (cultivating) serendipity that I derived from the systematic review of the literature.

ANTECEDENTS OF (CULTIVATING) SERENDIPITY

Based on my review, I synthesized existing research and developed a multi-level framework of (cultivating) serendipity that captures the individual- and organizational-level enablers and inhibitors that allow for serendipity to emerge in the organizational context. In the following, I discuss how and why organizations can cultivate serendipity by increasing the likelihood of serendipity trigger events and of noticing and bracketing weak cues, as well as by developing enabling conditions that help *materialize* (some of) those.

Individual-Level Catalysts, Enablers, and Inhibitors

Individual-level catalysts (see Figure 2) help individuals spot or create serendipity triggers and associations. As I discussed above, paying attention to weak signals and noticing and bracketing cues allows individuals and companies to grasp unexpected opportunities (Denrell et al., 2003; Winter, 2003). Informed by the above-mentioned demarcation of serendipity, my coding iterations led me to cluster factors related to noticing serendipity triggers (which I captured as *detection qualities*) and factors allowing for association (which I captured as *linking qualities*).

Detection and linking qualities. At the core of serendipity is the noticing of weak cues (Busch and Grimes, 2023), and the review surfaced *detection qualities* that can help identify cues (Thomas et al., 1993; Weick, 1995) such as unexpected serendipity triggers. Prior research has focused on variations of alertness ('active attention'; e.g., Cunha et al., 2010; Diaz de Chumaceiro, 2011; Erdelez, 1999), which can help recognize unexpected opportunities (Cunha et al., 2010; Denrell et al., 2003). Relatedly, curiosity (the desire to know, see, or experience; Lievens et al. 2022) has been identified as important antecedent (Busch 2020), as has intuition, which captures the sensing and identifying of potentially relevant information (Baldacchino et al., 2015; Cunha et al., 2010; Eubanks et al., 2010). Thus, qualities such as alertness, curiosity, and intuition can help identify and detect (Thomas et al., 1993; Weick et al., 2005) unexpected opportunities; I capture these as *detection qualities*.

To generate serendipity, associations need to be made (de Rond, 2014), and I identified related *linking qualities* of individual actors that allow them to interpret (see, Thomas et al., 1993; Weick, 1995) new information. While early works have focused on sagacity (e.g., Merton and Barber, 2004), recent work discussed related concepts such as generative doubt (i.e., purposeful search for understanding stimulated by the recognition of the limitations of existing understanding; e.g., Cunha et al., 2015), framing (i.e., the way actors perceive and categorize the world; e.g., Rauch and Ansari, 2021), improvisation (i.e., quickly and creatively reacting to a situation; e.g., Cunha and Berti, 2023; Fultz and Hmieleski, 2021), creativity (i.e., surfacing something new and valuable; e.g., Ross, 2023; also see Amabile, 2020), and analogous thinking (i.e., information describing relationships from one domain of knowledge can be used to surface problem-solution dyads in another domain; e.g., Gentner and Markman, 1997; Gick and Holyoak, 1980; van Andel, 1994). Previous experience often allows for analogous thinking, as it can enable individuals to identify connections between anomalies and experiences, and see the universal in the particular (Austin et al., 2012; Ericsson and Staszewski, 1989). Alexander Fleming, the discoverer of penicillin, for example, was able to identify mould as an opportunity given his previous expertise in the domain. It allowed him to use the unexpected event (mould that had developed on an accidentally contaminated staphylococcus culture plate) to associate a meaningful problem/solution combination, which ultimately led to the emergence of the most widely used antibiotic in the world.

I capture the qualities that can help social actors interpret unexpected information (Thomas et al., 1993; Weick et al., 2005) – such as sagacity, generative doubt, improvisation, creativity, and analogous thinking – as *linking qualities*.

To sum up, *detection* and *linking* qualities allow for spotting or creating serendipity triggers and associations, and thus, for (potential) serendipity to emerge. An illustration of these individual-level catalysts is the unexpected emergence of the potato washing machine that I discussed above: alert employees of the white goods manufacturer realized that the unexpected information that farmers used their washing machines to wash their potatoes might be a market opportunity for a new type of machine. (The company then integrated a dirt filter, and turned it into a new product, thus *materializing* the potential value).

However, *individual-level enablers and inhibitors* can propel or stifle the relationship between individual-level catalysts and (potential) serendipity.

Individual-level inhibitors and enablers. The review surfaced *inhibiting qualities* that can deter social actors from experiencing serendipity. Even if unexpected information has been identified and bracketed (see *individual-level catalysts*), it might not be articulated (and ultimately, not be materialized) in the organizational context (Busch, 2020) if individuals hold back on sharing information by *self-censoring* – the act of refraining from expressing something that others could deem objectionable (March, 1991). This can constrain actors and make them converge prematurely, as unexpectedly emerging thoughts or ideas might not be shared due to a perceived lack of legitimacy or the desire to appear rational (Busch and Grimes, 2023). Furthermore, while prior experience can be important for identifying or filtering anomalies (Austin et al., 2012; Von Hippel and von Krogh, 2016), experienced individuals are often mentally blocked from using tools and approaches in novel ways – a phenomenon known as *functional fixedness* (Adamson and Taylor, 1954; Duncker, 1945; German and Barrett, 2005). In fact, social actors that are skilled at specific methods often overlook innovation opportunities and often are less alert and open to new information (Allen and Marquis, 1964; Arnon and Kreitler, 1984; Busenitz, 1996). Thus, *inhibiting qualities* such as functional fixedness and self-censoring can limit the identification and/or articulation of weak cues that are at the core of serendipity (Cunha et al., 2010; Erdelez, 1999), and thus negatively impact the relationship between individual-level catalysts and serendipity.

In contrast, *enabling qualities* can propel the relationship between individual-level catalysts and (potential) serendipity. Prior literature, also in other fields, has highlighted the important role of qualities that relate to the articulation and integration of serendipitous observations within an organizational structure, such as self-efficacy (e.g., Busch, 2020; also see Bandura, 1977), perseverance (e.g., Austin, 2003; Burgelman, 2003), social skill (e.g., Busch and Barkema, 2022a; also see Fligstein, 2001), and cognitive flexibility (the ability to adapt our behaviour and thinking in response to the environment; e.g., Laurerio-Martinez and Brusoni, 2018; Ritter et al., 2012). These qualities can be important as the realization of unexpectedly emerging ideas and solutions often requires time and continuous experimentation (Austin, 2003; Burgelman, 2003; Napier and Vuong, 2013), as well as an openness to alternative ideas and assumptions (Cunha and Berti, 2023; Locke et al., 2008). Thus, given that these dynamics might lead to an amplification of alertness to new connections, I

contend that *enabling qualities* such as cognitive flexibility can positively influence the relationship between individual-level catalysts and serendipity.[8]

To sum up, *individual-level catalysts, enablers, and inhibitors* play a major role in the emergence of serendipity. To achieve a more holistic understanding of serendipity and how it can be cultivated in the organizational context, below I discuss the relevant organizational-level enablers and inhibitors that can directly or indirectly impact the emergence of serendipity.

Organization-Level Enablers and Inhibitors

The review surfaced succinct *social* and *resource integration mechanisms* (see Figure 2) that can directly or indirectly influence the detecting and linking of unexpected information and events, and thus, the emergence of serendipity.

Resource integration mechanisms. Social actors may recognize serendipitous opportunities, and yet still fail to enact those in the organizational context (Graebner, 2004; Regner, 2003; Ross, 2023). This points to the importance of an organization's ability to integrate new information into existing structures and processes (Cohen and Levinthal, 1990; Zahra and George, 2002). Often, organizational structures and processes that are more conducive to new information – for example, by providing flexible investments into new ideas – offer space for organizational members to be pro-active and create conditions for novel solutions to emerge (Cunha et al., 2015). The white goods company mentioned above uses investment committees to filter ideas and to place bets on unexpectedly emerging ideas such as potato washing machines, which it then scales up via its existing infrastructure. This approach allows the company to leverage the value in the value in the unexpected by being close to end users and allowing for fast iteration and resourcing. Organizations have used a variety of approaches to filter and invest into unexpectedly emerging ideas, for example, flash evaluations (based on intuition) or systematic evaluations (comprehensive analytical assessments that include factors such as timing and risk tolerance) (Napier and Vuong, 2013).

Thus, given that the materialization of serendipity depends on the integration of possible solutions into the organization (Graebner, 2004) – and that this integration often demands attentional, informational, or material resources (Busch and Barkema, 2022a) – I contend that *resource integration mechanisms* such as effective evaluation and direct resourcing impact the relationship between individual level-catalysts and the emergence of serendipity.

Social integration mechanisms. Serendipity often emerges based on the skills and interactions of several people (Cunha et al., 2010; Meyers, 2007). The success of penicillin, for example, required the work of Howard Florey and Ernst Chain, even if Alexander Fleming received most of the accolades (Copeland, 2018; Cunha et al., 2010; Meyers, 2007). Given that serendipity relies on the association of previously unrelated pieces of information and ideas (Hargadon and Bechky, 2006; Napier and Vuong, 2013), it is more likely to emerge in group settings that facilitate meaningful interactions and thus allow social actors to understand the broader relevance of an unexpected observation (Busch, 2020; Busch and Barkema, 2022a). This highlights the importance of the respective social embedding, i.e., the nature, depth, and extent of an individual's social ties (Busch and Barkema, 2022b; McKeever et al., 2014, p. 222). Social networks can support the emergence of fortunate

encounters if they increase the amount and/or diversity of interactions (McCay-Peet et al., 2015; McDaniel and Walls, 1997), thus potentially increasing the surfacing and sharing of unexpected ideas.

Organizations can facilitate these networks for their members via means such as physical and virtual space design (Björneborn, 2017; Catmull, 2008; McCay-Peet and Toms, 2018). Google and Pixar, for example, organized their office spaces in ways that maximize cross-pollinations of people across different areas. Pixar developed a big single office building as headquarters that included a big atrium, a central coffee shop, and mailboxes at the centre, thus nudging the previously separated creatives, developers, and management team members to 'bump into each other' by design (Catmull, 2008; Lehrer, 2011). Other companies have facilitated unexpected positive encounters ('watercooler moments') via learning lunches (e.g., HubSpot) or random coffee trials (e.g., NESTA), whereby people are randomly matched with each other. Given that (unexpected) associations thrive when people with diverse perspectives interact (Busch, 2020; Nahapiet and Ghoshal, 1998), I contend that *social embedding* impacts the relationship between individual-level catalysts and the emergence of serendipity.

However, this only holds true if people do in fact connect with each other (Lane et al., 2021; see below). While social embedding is important, individuals need to have the motivation and ability to cooperate, being it due to mutual interests, values, or shared causes or problems (Foster and Ford, 2003; Rauch and Ansari, 2021). This requires the formulation of relevant organizational problem areas that help individuals identify and filter emerging ideas – and know what (not) to prioritize (Von Hippel and von Krogh, 2016). But if problem definitions become overly specified, this can limit possibilities, and the attachment to specific problems, goals, and plans can create selective inattention (Harrison et al., 2007), with anomalies being considered an unacceptable deviation from plans rather than as an opportunity (Cunha and Berti, 2023). Thus, less narrowly defined problems (and related plans) tend to increase the likelihood of spotting unexpected opportunities (McCay-Peet and Toms, 2010; Toms, 2000; Von Hippel and von Krogh, 2016).[9]

A typical example in the business context is related to profitability: A manager might tell their staff to 'reduce costs', which might lead to employees focusing on solutions such as reducing headcount or buying less expensive supplies. However, if instead the problem was defined as 'increase profits', employees might come up with additional (and potentially unexpected) suggestions such as substituting the product with a more efficient option or raising the selling price (Von Hippel and von Krogh, 2016).[10]

Thus, *social integration mechanisms* such as social embedding and problem formulation can enable or inhibit serendipity. However, often, power dynamics can influence the definition of what constitutes a problem or acceptable solutions – that is, which ideas get picked over others – and ideas (and/or social actors) might not be invested in or be outright suppressed if they are not (acting) in the interest of the ruling group, or if the respective social actor does not have the ability to assert power (Clegg, 1989). Thus, even if an idea enters the orbit of the organization, it might not be integrated. Organizations have taken steps such as integrating people into teams outside of the organizational structure to shield innovation efforts from politics (Jeppesen and Lakhani, 2010; Von Hippel and von Krogh, 2016).

Social integration mechanisms can also help expand (or constrain) serendipity in indirect ways. Previous research has highlighted the role of *psychological safety* (the belief that one can speak up without risk of punishment or humiliation; Edmondson, 1999; Edmondson and Mortensen, 2021) in allowing individuals to freely share ideas. Identifying and voicing unexpected opportunities is more likely in settings in which individuals feel that they can present themselves as change agents without fear of negative consequences regarding status and self-image (Edmondson, 2018; also see Cunha et al., 2015). In these settings, actors tend to be more open to discuss diverse or not yet fully developed ideas (Catmull, 2008; Cunha et al., 2010). Ways to increase psychological safety include giving people the feeling that their inputs are welcome by formulating shared meaning and by expressing appreciation (Edmondson, 1999). At high-performing companies such as Pixar, executives in meetings mention that all of their products (e.g., movies) started out as bad ideas – thus giving their employees the confidence to discuss newly-formed ideas. These approaches make it less likely for social actors to self-censor, and more likely to proactively spot, articulate, and enact serendipity (Busch, 2020; Napier and Vuong, 2013).

Thus, I contend that *social integration mechanisms* such as psychological safety positively influence *enabling* (e.g., self-efficacy) and *inhibiting* (e.g., self-censoring) qualities. However, as discussed above, processes of unexpected change are often interrupted by power dynamics and politics (Austin et al., 2012), and can thus also indirectly affect the emergence of serendipity, as individuals might self-censor when they expect penalties (Austin et al., 2012).

In all, *organization-level enablers* and *inhibitors* can directly as well as indirectly (via impacting *individual-level enablers and inhibitors*) influence the emergence of serendipity; organizational dynamics, in turn, are shaped by individuals (Busch and Barkema, 2022a).

Boundary Conditions

The literature on event-based theorizing (e.g., Morgeson, 2005; Morgeson et al., 2015) points to important additional boundary conditions that can help us understand the constraints of the emerging theory. First, *event strength* (Ballinger and Rockmann, 2010; Bechky and Okhuysen, 2011; Morgeson et al., 2015), which I already touched on above. When events are novel and disruptive (i.e., reflect a discontinuity; Anderson and Tushman, 1990) and/or critical (i.e., important to an entity; Morgeson and DeRue, 2006), they can break entities out of their conventional thinking and take them 'by surprise'. This suggests that the more novel, disruptive, and critical an event, the more likely it is that it will lead to breaks in expectations and change behaviours and features (Ballinger and Rockmann, 2010; Morgeson et al., 2015). These expectations and behaviours are often shaped by factors such as values, norms, and socio-economic background (Busch, 2020; House et al., 2004; Pidduck et al., 2020).

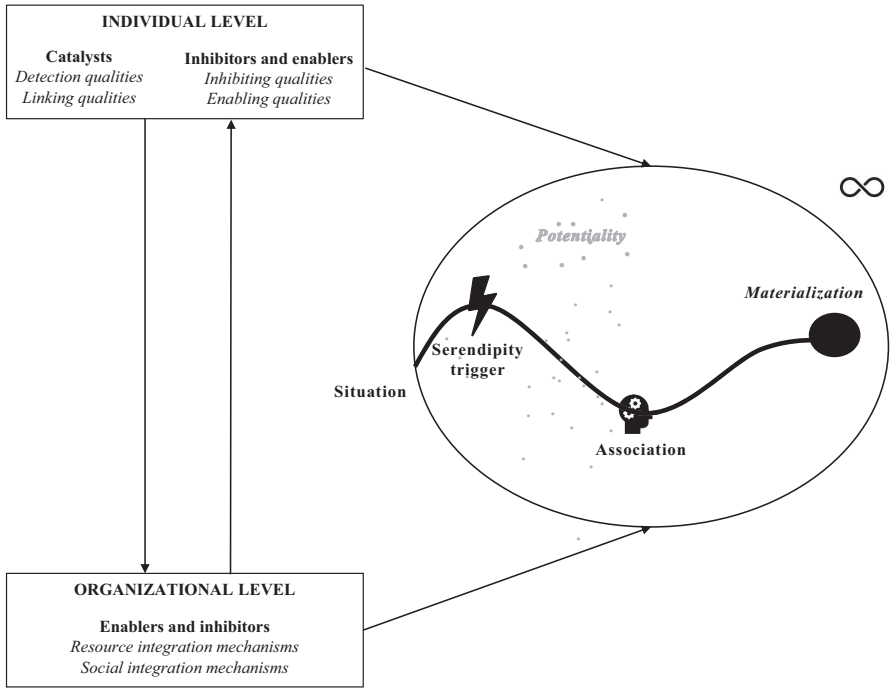
Second, *timing*. Events are bound in time, and the timing of events in an individual's, project's, or organization's developmental history can play a relevant role regarding their eventual impact (Morgeson et al., 2015). Individuals and teams tend to go through different phases of development (Mirvahedi and Morrish, 2017), each phase associated with specific challenges and requirements. Thus, I expect that events are more likely to be turned into serendipitous outcomes if they match the respective organization's priorities and challenges at the specific point in time (also see Morgeson et al., 2015). This tends

to be particularly relevant in the early phases of a project, in which alertness to new information tends to be higher than in later stages (Cunha et al. 2010; Miyazaki 1999).[11]

Thus, event strength and timing are important boundary conditions of the emerging theory.

MULTI-LEVEL CONCEPTUALIZATION OF CULTIVATING SERENDIPITY

The emerging theory is rooted in probability and based on the premise that social actors can expose themselves to potential triggers and seed or detect weak cues that can materialize into serendipitous outcomes (see, Busch, 2020; Pirnot et al., 2013). Any change in the organizational apparatus will change the *potentiality/materialization* dynamics (see Unruh, 1994), and hence, (potential) serendipity. Figure 4 captures the emerging multi-level conceptualization of *cultivating serendipity*: *Individual-level catalysts* (e.g., alertness) and *individual-level enablers and inhibitors* (e.g., cognitive flexibility) impact and are impacted by *organization-level enablers and inhibitors* (e.g., social embedding), and influence the emergence of serendipity. I conceptualize the process of cultivating serendipity in the organizational context as a multi-level process of enabling *potentiality* (creating a latent space of possibility by increasing the likelihood of detecting trigger events as well as of noticing and



* The system constantly evolves (with potentially infinite interconnected potentialities and materializations), creating an organizational serendipity field. Steps might happen simultaneously or draw out over time.

Figure 4. A multi-level model of (cultivating) serendipity*.

bracketing weak cues) and *materialization* (enacting a specific possibility), ad infinitum and interconnected. The system of interconnected potentialities (and materializations) and the organization's capacity to detect and act on unexpected potential discoveries held in those forms a space that holds the potential for different sets of interwoven relationships and serendipitous outcomes. It is both system-inherent and socially constructed (see Hahn and Knight, 2021; Lord et al., 2015 for a related discussion), and highlights the role of individual and organizational agency in the creation and harnessing of (potential) serendipity.

Let us return to the potato washing machine example that I discussed above to illustrate these dynamics: an unexpected event (farmers washing their potatoes in washing machines) was observed by alert sales representatives (*detection qualities*), who instead of discarding the information sagaciously connected the dots, realizing that integrating a dirt filter might make a potato washing machine a viable product option (*linking qualities*). The company helped *materialize* this into a new product category by investing into the unexpectedly emerging idea (*resource integration mechanisms*). A possible counter-factual ('what could have happened instead?'; Cornelissen and Durand, 2012; Durand and Vaara, 2009) could have been the individual not *detecting* the anomaly; *inhibiting qualities* such as functional fixedness getting in the way of realizing its value; or the company failing to invest due to resource constraints or power dynamics (and thus not *materializing* the *potentiality*). In that case, serendipity would have been missed even if it could theoretically have been possible (see, Barber and Fox, 1958). Importantly, as this example illustrates, there are multiple (and multi-level) configurations that are possible that combine catalysts, enablers, and inhibitors on the individual and organizational level.

Operationalization and Counterfactuals

For the theoretical model to be useful for future research, we need to know how to identify, capture, and operationalize serendipity. Recent work has operationalized serendipity in promising ways, and effective measures that have been used in the literature (see e.g., Busch, 2020; Dew, 2009; Fultz and Hmieleski, 2021; Yaqub, 2018) are: (1) 'As we seek to solve one problem, we often discover the solution to a completely different problem'; (2) 'As we go about our normal business operations, we often discover solutions to problems we weren't originally looking for'; (3) 'We often stumble on unexpected opportunities for new products or services'; (4) 'When we try to solve a particular problem, we often find a solution that is unexpected'; (5) 'We often develop new products or services in unexpected ways'. Further research could further explore these issues.

A particularly promising way forward might be to explore counterfactuals (Cornelissen and Durand, 2012; Durand and Vaara, 2009). Realized history is often not efficient (Carroll and Harrison, 1994), and can be considered as being drawn from a pot of possible histories. If one were to rerun the draw, it is likely that an alternative history would unfold (March, 1991). Exploring possible counterfactuals can help us understand the role of individual effort and agency in 'lucky' outcomes. For instance, when developing alternative histories for an event, contrast explanations start by holding all causal factors constant except the ones of interest (Liu and

de Rond, 2016; Tsang and Ellsaesser, 2011). Other approaches focus on developing alternative histories in more open-ended ways (e.g., Alvesson and Sandberg, 2011). This can help to generate plausible counterfactual histories in systematic ways (Liu and de Rond, 2016).

Take the example of floppy-eared rabbits, which has been used as an example to illustrate 'serendipity lost' vs 'serendipity gained' (Barber and Fox, 1958). Two scientists at around the same time made the unexpected observation that the ears of rabbits flopped after they were injected with the protein papain. Only one of the researchers realized that this might be an effective way to tackle arthritis, which led to important, prize-winning results (Barber and Fox, 1958). Thus, 'serendipity gained' was based on the individual's agency in response to an unexpected event, while 'serendipity lost' was based on the same unexpected event but not met by individual agency in response to this event. Therefore, observing how individuals respond (differently) to a particular chance event – and how different responses can be linked to different outcomes – can help us understand serendipity (Busch, 2020; Denrell et al., 2013; Liu and de Rond, 2016).

DISCUSSION

I contribute to the emerging literature on serendipity in the management context a systematic review and multi-level conceptualization of how, when, and why serendipity emerges – and is dynamically constituted – in the organizational context. I make two primary contributions.

Conceptualizing and Demarcating Serendipity in the Organizational Context

First, I contribute an ontological, cross-disciplinary insight into the composition and characteristics of serendipity in the organizational context. Based on a systematic review of serendipity in the management context, I derive three necessary conditions of serendipity (*agency*, *surprise*, and *value*) that – as I will discuss in more detail below – help differentiate it from related concepts such as luck (e.g., Wiseman, 2003) and targeted innovation (e.g., Busch and Grimes, 2022), as well as from potential antecedents such as curiosity and creativity (Race and Makri, 2016; Ross, 2023; also see Amabile, 2020; De Bono, 1992). Synthesizing prior research that primarily conceptualized serendipity as a process (e.g., Denrell et al., 2003) or an outcome (e.g., Yaqub, 2018), I delineate serendipity as 'surprising discovery that results from unplanned moments in which our decisions and actions lead to valuable outcomes'. Theoretically sensitized by event-based approaches (Morgeson, 2005; Morgeson et al., 2015), sensemaking (Thomas et al., 1993; Weick, 1995; Weick et al., 2005), and quantum approaches to management (e.g., Hahn and Knight, 2021; Lord et al., 2015), I demarcate serendipity and its building blocks in the organizational context, and contribute to clarity and structure in this domain. This helps overcome the conceptual ambiguity in a literature characterized by phenomenological discussions, and thus increases validity and managerial actionability (Busch and Grimes, 2023).

What serendipity is not. The emerging conceptualization allows to define what serendipity is – and what it is not. Using the necessary conditions of *surprise*, *value*, and *agency* as a prism, serendipity can be differentiated from concepts such as structured problem-solving and search (and related targeted innovation), as well as from luck. Structured problem-solving requires *agency* and can create *value* but usually there is little *surprise*: social actors go 'from A to B'; i.e., they face an initial problem and propose solutions to that problem, usually with few surprises along the way (Von Hippel and von Krogh, 2016; Yaqub, 2018). Often, innovation – 'the production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems' (Crossan and Apaydin, 2010, p. 1155) – emerges this way (Busch and Grimes, 2022). The innovation process often starts with a problem that has been identified or formulated for solving, and then involves a structured search for a (new) solution to that problem (Jeppesen and Lakhani, 2010; Von Hippel and von Krogh, 2016). This 'planned' or 'targeted' innovation is often facilitated by new technologies such as artificial intelligence (Busch and Grimes, 2022). However, innovation can also emerge serendipitously, for example, when the problem/need and solution unexpectedly emerge at the same time; when actors find an unexpected solution to a problem they were trying to solve; or when they find an unexpected solution to another problem (Busch, 2020; Von Hippel and von Krogh, 2016). Then, problem/solution combinations that were not previously formulated emerge by surprise (Von Hippel and von Krogh, 2016). Thus, serendipitous innovation can be differentiated from targeted innovation by its element of *surprise*, and unplanned, exploratory learning outcomes often emerge from experimentation (Garud et al., 2018; Smith and Hibolling, 2022; Toivonen et al., 2022).

Luck ('good things that happen to you by chance, not because of your own efforts or abilities'; Oxford Dictionary, 2021), in turn, includes the elements of *value* and *surprise* but not of *agency*. As the definition illustrates – and prior research acknowledges (e.g., Busch, 2020; Liu and de Rond, 2016) – luck differs from serendipity in the 'passiveness' of social actors (Copeland, 2022). While serendipity relies on social actors' ability to turn unexpected events into positive outcomes – and thus represents a process that can be influenced – luck as a mere event is beyond the influence of social actors (Austin, 2003; Bawden, 1986). It comes 'with no effort on our part' (Austin, 2003, p. 71) and is thus 'unattributable to any actions or qualities of the recipient' (Bawden, 1986, p. 205).[12]

Thus, by deriving the necessary conditions of serendipity, I provide a prism by which serendipity can be differentiated from related concepts such as targeted innovation or luck.

Multi-Level Theory on the Process of Cultivating Serendipity

Second, I contribute a multi-level theory of the process of (cultivating) serendipity.[13] Based on a systematic review, I derived the antecedents of (cultivating) serendipity, and theoretically sensitized by quantum approaches to management (e.g., Hahn and

Knight, 2021; Lord et al., 2015) and sensemaking (Weick, 1995; Weick et al., 2005), I conceptualized *cultivating serendipity* as a process of enabling *potentiality* and *materialization* via *individual-level catalysts and enablers* such as *detection* and *linking qualities*, and *organization-level enablers and inhibitors* such as *social* and *resource integration mechanisms*. Event-based theorizing (e.g., Morgeson, 2005; Morgeson et al., 2015) helped establish related boundary conditions (*event strength* and *timing*).

Importantly, sense-making is often a collective process, as information about an event is extracted and interpreted by individuals and organizations over time (Schwandt, 2017; Stigliani and Ravasi, 2012; Weick, 1995). I theorize that this multi-level process can bring out infinitely many potential meanings, but it may be only one – the meaning enacted through *materialization* – that ultimately survives.[14] Quantum theory – which is concerned with what we can and cannot know and say about physical reality (Hahn and Knight, 2021) – could provide important additional insights in this regard. For example, it could be interesting to explore how and when *potentiality* 'collapses' into one enacted option, which opens up intriguing venues for further research.

Cultivating serendipity – and its underlying notion of expecting and preparing for the unexpected – presents an exciting paradox (Cunha et al., 2010, 2015; also see Pradies et al., 2021; Smith and Lewis, 2022): while serendipity by definition is based on unexpected events and thus involves an element of surprise (Cunha et al., 2010; Meyers, 2007), the 'cultivation' part is about developing preparedness and exposure that allows for recognizing and leveraging the value in the unexpected (Busch and Barkema, 2022a; Kamprath and Henike, 2019; Knudsen and Lemmergaard, 2014). Prior research in – and outside of – the field of management studies has shown that individual-level factors such as sagacity and previous knowledge (e.g., Austin et al., 2012; Merton and Barber, 2004) and organization-level factors such as virtual and physical space design (e.g., Björneborn, 2017; Busch and Barkema, 2022a) can help organizations leverage the value in the unexpected by increasing the likelihood of serendipity to occur (Cunha and Berti, 2023; Fultz and Hmieleski, 2021). However, in the management context we lack theory on the interplay between those dynamics, as well as related boundary conditions. This is particularly relevant given that an individual's serendipitous outcome might not be useful for an organization if it is not being integrated effectively (Busch, 2020). Thus, alignment between individual and organizational intentions and dynamics becomes paramount to create organizational value (Cunha et al., 2015), and the emerging conceptualization helps capture these multi-level dynamics.

Importantly, the goodness of particular serendipitous outcomes is in the eye of the beholder; for example, the discovery of precious metal deposits might be a fortuitous event for the prospecting company but might cause the dispossession and loss of life for native populations. And crucially, while the focus of this paper has been on the organizational process of (cultivating) serendipity, the initial *situation* – and changes therein – is often augmented in path-dependent processes (Denrell et al., 2013; Dierickx and Cool, 1989; Liu and de Rond, 2016). For example, exceptional performers might have started out with specific privileges (or 'blind' luck) that are amplified over time (see, Barnsley et al., 1985; Liu and de Rond, 2016). Adversely, zemblanity ('the faculty of making unlucky

discoveries by design'; Boyd, 1998; also see Anker, 2017; Giustiniano et al., 2016, 2020; Love et al., 2019) might come into play for social actors that were initially placed into 'bad situations'. This can lead to variance in expectations: for example, in different cultures or socio-economic strata exist different levels of what individuals consider their realm of possibility (see, Kish-Gephart et al., 2022; Pidduck et al., 2021). Future research could dive deeper into these dynamics.

In all, I explicate how organizations can facilitate (or constrain) the emergence of serendipity, and illustrate how studying specific enactments (i.e., *materialization*) may help us understand organizational-level phenomena (Dyck and Greidanus, 2017; Hahn and Knight, 2021). By 'unblurring' the boundaries of the concept of serendipity, conceptualizing it in an organizational context, and placing greater focus on mechanisms for cultivating serendipity, this work makes it easier for organizations to leverage (potential) serendipity in ways that may create tangible value through innovation in processes, products, and services.

Managerial Implications

This theory of (cultivating) serendipity offers important managerial implications. First, it suggests that social actors have agency when it comes to creating serendipity: like training 'hard skills' related to finance or engineering, it is possible to train serendipity-related skills such as alertness. Serendipity is a process that can be influenced: serendipity triggers can be seeded or spotted, and the ability to associate can be trained (e.g., via analogous thinking). Thus, organizations are well-advised to invest into related training programs to be able to navigate a fast-changing world in which complex environmental and societal issues will require skills and related mindsets that help turn unexpected observations into positive outcomes (Busch, 2020; Makri et al., 2014; Pidduck et al., 2021; Rosing et al., 2011; also see Vera and Crossan, 2005), and help identify unforeseen possibilities and connections hidden in them (see Andriani et al., 2017; Andriani and Kaminska, 2021; Hagel et al., 2010; Harmeling and Sarasvathy, 2013). My hope is that by providing a 'vocabulary' and framework related to the emergence and cultivation of serendipity, it becomes actionable for individuals and organizations alike, allowing executives to no longer pretend that they knew (or planned) everything. Instead of a threat to authority and an 'error factor' to be reduced, the unexpected then potentially becomes a source of opportunity and delight.

Second, it suggests that companies can influence their propensity for serendipity by developing organizational enablers (e.g., related to specific *social integration mechanisms* such as facilitating psychological safety; see Edmondson, 2018) that incentivize employees to create unexpected positive outcomes for their organization. In related research, my research team found that the CEOs of successful multinational companies often consider serendipity to be at the core of their organizational success; for example, Hubert Joly, former CEO of BestBuy, contended that 'our reaction to the unexpected defines who we are', and Tom Linebarger, CEO of Cummins, suggested that 'cultivating serendipity is an active approach to leadership in times of uncertainty'. Serendipity can play a particularly important role in established companies after a leadership transition, in times of radical contextual change, and when new leaders

look for new impulses and thus aim to break out of potential path dependencies that might have led to functional fixedness (Busch, 2020). It could also have important implications regarding how ventures can identify new opportunities effectively (also see Brown, 2005; Colman and Lunnan, 2011; George et al., 2016; Hilmersson et al., 2021; Lumpkin and Lichtenstein, 2005; Meyer and Skak, 2002; Ucbasaran et al., 2009).

Third, support organizations such as incubators and government agencies can use this multi-level framework to develop support structures that help cultivate serendipity. An appreciation of (the unexpected emergence of) valid local solutions – and investing into those – can help avoid making fixed assumptions about 'what is best' for the respective member(s), and help combine a traditional foresight/planning approach with an openness to local knowledge, especially in high-uncertainty contexts (Busch and Barkema, 2021). This might lead to important changes in how these support organizations define success: Instead of focusing on how many entrepreneurs graduate an incubator program (e.g., Amezcua et al., 2013), for example, celebrating effective pivots might be more effective. This could help social actors explore *potentiality* even if they already committed to a particular materialization opportunity, and thus, become who they are truly capable of becoming (see, Von Goethe 1801).

Limitations and Further Research

My paper has several limitations that open up fruitful avenues for further research. First, while we can establish patterns behind the emergence of serendipity and related dynamics, it is often accounted for retrospectively, and seeing patterns where there are none is a valid concern when it comes to many stories related to serendipity. In fact, actual and rhetorical serendipity might differ: social actors might make stories more serendipity-sounding to make sense of their significance or to present them as more exciting than they are. Or vice versa, in their desire to seek order in their lives, social actors might airbrush serendipity out of their stories to be (perceived as being) 'in control,' especially if 'not always being in control' is stigmatized in an organization. The literature has discussed several related biases such as survivor bias and hindsight bias (e.g., Liu and de Rond, 2016). In general, good stories tend to be less probable than less satisfactory ones (Kahneman and Tversky, 1973), and given that social actors often over-estimate the importance of their own efforts (Busch, 2020), researchers are well-advised to not rely on interviews with protagonists only, but to use different types of data collection methods such as experiments, observations, and other approaches that could help establish causality.

Second, empirical work is needed to test the identified relationships across different contexts. For example, how do these dynamics play out in the context of virtual work (e.g., Gratton, 2020), or how do new technologies such as artificial intelligence impact those (Busch and Grimes, 2022; Leavitt et al., 2021)? How can companies develop more inclusive theories of value creation, for example related to pro-social purposes that allow individuals to connect unexpectedly emerging events to broader societal challenges? How can different stakeholders (Dmytriyev et al., 2021; Freeman, 1984) collectively cultivate serendipity to develop sustainable solutions in a world in which

complex environmental and societal issues will require innovative and collaborative solutions (also see Cattani and Malerba, 2021; George et al., 2016; Rindova and Martins, 2021; Wickert et al., 2020)? What is the broader set of contextual factors that the organizational apparatus is a part of, and how do the different elements influence the emergence of serendipity?

Third, could a theory of serendipity help articulate a novel perspective regarding competitive advantage? In a world full of unpredictable events (Alvarez et al., 2018), existing theories often cannot explain why companies that show structural (e.g., Porter, 1996; Puranam and Vanneste, 2016) and/or resource advantages (e.g., Barney, 1986, 1991) are being disrupted by companies that do not have these advantages. Strategy is often emergent (Mintzberg, 1978), and cultivating serendipity might allow individuals, companies, and regions to develop a competitive advantage in a world characterized by complex societal challenges. Further research could build on event-based theorizing (e.g., Morgeson et al., 2015) to develop alternative theories of competitive advantage, and perhaps, a *serendipity-based view of the firm*.

CONCLUSION

In this paper, I synthesized prior research on serendipity in the organizational context to derive its necessary conditions and building blocks, as well as antecedents and surrounding dynamics. Based on the three necessary conditions that I derived from the systematic review – *agency*, *value*, and *surprise* – I differentiated serendipity from related concepts such as luck. Anchored in these conditions and addressing the overall question in the introduction, I showed how, why, and when (i.e., under what conditions) serendipity in the organizational context unfolds as a multi-level process. Drawing from the literatures on sensemaking, quantum approaches to management, and event-based theorizing, I developed a multi-level conceptualization of (cultivating) serendipity that is both inter-disciplinary and actionable. I hope that it will help 'connect the dots' between different levels of analysis, inspire more research in this important area, and support practitioners in developing organizations that are able to leverage the value in the unexpected – and most importantly, enable them to become who they are truly capable of becoming.

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NOTES

[1] The list (as of 2021) includes: *Academy of Management Journal; Academy of Management Review; Accounting, Organizations and Society; Administrative Science Quarterly; American Economic Review; Contemporary Accounting Research; Econometrica; Entrepreneurship Theory and Practice; Harvard Business Review; Human Relations; Human Resource Management; Information Systems Research; Journal of Accounting and Economics; Journal of Accounting Research; Journal of Applied Psychology; Journal of Business Ethics; Journal of Business Venturing; Journal of Consumer Psychology; Journal of Consumer Research; Journal of Finance; Journal of Financial and Quantitative Analysis; Journal of Financial Economics; Journal of International Business Studies; Journal of Management; Journal of Management Information Systems; Journal of Management Studies; Journal of Marketing; Journal of Marketing Research; Journal of Operations Management; Journal of Political Economy; Journal of the Academy of Marketing Science; Management Science; Manufacturing and Service Operations Management; Marketing Science; MIS Quarterly; Operations Research; Organization Science; Organization Studies; Organizational BehaviourBehavior and Human Decision Processes; Production and Operations Management; Quarterly Journal of Economics; Research Policy; Review of Accounting Studies; Review of Economic Studies; Review of Finance; Review of Financial Studies; Sloan Management Review; Strategic Entrepreneurship Journal; Strategic Management Journal; The Accounting Review*.

[2] Quantum theory is concerned with what we can and cannot know and say about physical reality. It is inherently probabilistic and based on the idea that all we can know about reality is the probability of experiencing a particular instantiation of it—which constitutes the 'actual' reality (Ball, 2018; Hahn and Knight 2021). I limited the use of quantum theory insights to those that have been strongly anchored in substantive management research (e.g., Hahn and Knight 2021; Lord et al., 2021).

[3] This aligns with serendipity-related work in other disciplines, which has focused on the importance of agency and surprise (e.g., Björneborn 2017; Makri & Blandford, 2012a, 2012b).

[4] Thus, while for analytical purposes I separate 'trigger' and 'association,' they can occur at the same time, or with a time lag (Busch 2020; Makri and Blandford 2012b; McCay-Peet and Toms 2015). This delay between the serendipity trigger and the related association can make it difficult for the respective social actor(s) to recall and properly attribute the original source of the observation, and what might appear like a spontaneous idea is often the result of previously forgotten insights that help social actors make sense of events (Busch 2020). I consider as 'obvious' associations those incidences in which there is a straightforward link that the observer makes; for example, when person A meets a stranger B in the train, who tells them about a job opportunity that they subsequently exploit. Here, the 'obvious' association is between the job and the need for a job. Also, while mental connections most commonly occur in pairs (even when making multiple observations/connections at once), they can also more rarely happen across multiple 'nodes' at once (e.g., coming across a journal article that might interest two different colleagues.) I am grateful to Lennart Björneborn and Stephann Makri for their helpful insights related to these dynamics.

[5] An analogy from quantum theory might be useful here: the process forces ('collapses') a superposition state (i.e., the ability of a system to be in multiple states at the same time until it is 'measured') into a discrete state; that is, a specific enactment emerges from the space of indeterminate possibilities (Dyck and Greidanus 2017; Griffiths, 2005; Hahn and Knight 2021). In quantum theory, 'measurement' refers to the enactment of one of the potentialities through mental or social construction (Hahn and Knight 2021; Rae 1986). This measurement is a 'selective enactment,' whereby 'selective' denotes that not all possible outcomes in a situation will get enacted. I thank Tobias Hahn for this important observation.

[6] I thank an anonymous reviewer for this great insight.

[7] Some authors have labelled examples such as penicillin as 'pseudo-serendipity' (e.g., de Rond 2014), as Fleming's team was somewhat prepared due to their general interest in the antibiotic effects of substances. In this logic, 'true' serendipity would require a change in objective (Roberts 1989). However, most researchers do not share this narrow notion, and rather look at serendipity in the broader sense – else, many of the most well-documented serendipity stories, including that of penicillin, would be 'pseudo-serendipitous' (also see Björneborn 2017; Bogers and Björneborn 2013; Copeland 2018). In this paper, based on my systematic review and anchored in the three conditions mentioned above, I cover the whole spectrum, which includes occurrences of everyday 'micro-serendipity' (Bogers and Björneborn 2013). This implies that 'weak cues' have to be 'weak enough' to create surprise but not so weak so as not to be noticed. I am grateful to Stephann Makri for helping me think through these ideas.

[8] The way actors perceive the world is part of constructing opportunities and constraints (Reinecke and Ansari 2015; Wiseman 2003), and ultimately, serendipity. Thus, individual traits such as self-awareness and humility can make the above-mentioned dynamics more likely to occur, as individuals can become aware of their blind spots and start questioning their assumptions – which potentially increases their openness to different perspectives (Busch and Grimes 2023; also see Cunha and Berti 2023).

[9] In one experiment, for example, participants were asked to interact with a reading device. Some participants were instructed to find some specific information, others were given no task at all. The first group often found the specific information they were instructed to seek out; the second group were more exploratory and came away with interesting novel information that was not sought (Toms 2000; McCay Peet & Toms, 2010).

[10] In recent years, companies have used the development of a broader social purpose, for example related to the UN's Sustainable Development Goals, to maintain a broader 'north star' while embracing emergent strategy, allowing for the emergence of serendipity. The ensuing collective identity based on a shared cause and mutual interests can help facilitate a general willingness even in teams that have strong differences in perspective (Busch 2020; Foster and Ford 2003).

[11] While I assume that serendipity often emerges in settings where problems cannot easily be defined ('ill-defined problems'; Simon 1977) because alertness tends to be higher than if problems can be identified and specified in advance and a structured search might be underway ('well-defined'; Simon 1977), the degree of surprise might be limited given that most events are potentially unexpected. I thank an anonymous reviewer for this observation.

[12] An unexpected event itself can be (perceived as) 'lucky' (e.g., unexpectedly inheriting money) or 'unlucky' (e.g., a sudden recession forcing a company into bankruptcy); social actors then can (try to) subsequently use their agency to utilize the event as an inflection point for serendipity (Busch 2020). Thus, even unexpected events that at first glance appear to be 'unlucky' might lead to the identification of new opportunities, for example, when an unexpected bankruptcy triggers the establishment of a new, more successful company by the same entrepreneur (Busch 2020; also see Napier & Hoang, 2013).

[13] As outlined earlier, 'multi-level' refers to all the possible configurations and combinations of catalysts, enablers, and inhibitors on individual and organizational levels.

[14] I thank Robert Lord for this excellent observation.

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