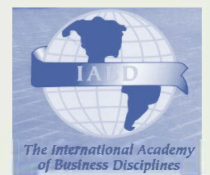

QRBD

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EMBRACING THE FUTURE: THE IMPORTANCE OF INTERDISCIPLINARY ACADEMIC JOURNALS

Vance Johnson Lewis, Oklahoma City University

In this, our final issue of our tenth anniversary of publication, the importance of *QRBD* remaining a quality interdisciplinary journal has been keenly on my mind. Academia has historically been decidedly siloed, with journals having very narrow lines of specialization (one of my favorite activities during graduate school at Oklahoma State University was to go to the basement of Edmon Low Library and raffle through the dust-covered journals from the early part of the 20th century...amazed at how narrowly focused the topics contained within were). While we as scholars still primarily communicate within our fields, there has been a growing recognition of and appreciation for collaborative work and society itself almost demands interdisciplinary approaches due to the ever-growing complexity and multifaceted nature of the problems needing to be solved. While academia, particularly within the tenure system, seems to work against interdisciplinary research, I believe that as academia continues to evolve, interdisciplinary journals such as *QRBD* will serve to drive innovation, foster collaboration, and offer platforms for more holistic forms of knowledge.

Encouraging Innovative Research

Interdisciplinary academic journals have the potential to dismantle traditional disciplinary boundaries, enabling scholars to pursue innovative research that transcends disciplinary constraints. By encouraging novel approaches and integrating diverse perspectives, these journals pave the way for groundbreaking discoveries, which may not have been possible within a single discipline. For instance, the winner of the first best paper award in the journal *Business and Society* brought together researchers from sociology, psychology, and organizational theory to develop a framework to reduce greenhouse gas emissions (Slawinski, Pinkse, Busch, & Banerjee, 2017). Such interdisciplinary breakthroughs will likely become increasingly common, contributing to a more comprehensive understanding of complex topics.

Facilitating Collaboration

Interdisciplinary journals create spaces for scholars from diverse disciplines to collaborate, fostering a spirit of cooperation and knowledge exchange. Collaboration across disciplines not only broadens perspectives but also enhances problem-solving capabilities. By facilitating academic interactions, interdisciplinary journals serve as catalysts for the coalescence of ideas and the exploration of uncharted territories.

Promoting Holistic Knowledge

Interdisciplinary journals have the potential to enrich academic discourse by bridging the gap between specialized fields. They offer platforms for scholars to synthesize knowledge across various disciplines and provide comprehensive assessments that offer unique insights. By combining essential elements from different areas, these journals contribute to a more holistic understanding of complex phenomena. An example is the journal *Environmental Science &*

Technology, which integrates research from environmental science, chemistry, and engineering to address environmental challenges holistically. Through the interdisciplinary approach, scholars can develop practical and effective solutions for pressing environmental issues (Job et al., 2019).

CONCLUSION

As our world becomes more and more complex, there is a greater need for experts and researchers to come together to collaborate and address these emerging and dynamic issues. By breaking down disciplinary silos, enabling collaboration, and promoting holistic knowledge, while their acceptance rates may not be at the practically unattainable levels as journals that proclaim themselves the definitive word on what is and is not important to know, interdisciplinary journals will continue to think outside the box, pushing the boundaries of knowledge creation and innovation. Embracing interdisciplinary research and fostering academic collaboration will undoubtedly be instrumental in addressing global challenges and forging a more integrated and enlightened future.

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REVIEWER SPOTLIGHT

In keeping with our new *QRBD* tradition, in this double issue we honor two of the many dedicated volunteers who gave their time to ensure that our journal maintains not just quality double-blind reviewing but also investment their time to aid colleagues in the development and finalization of their contributions to scholarship. As we have two in the spotlight, we first look at longtime *QRBD* contributor Dr. H. Paul LeBlanc III and first time *QRBD* reviewer Dr. Yuri Hupku.

H. Paul LeBlanc III

H. Paul LeBlanc III, Ph.D., is a Professor of Communication and former chair of the Department of Communication at the University of Texas at San Antonio. Paul has been a member of the International Academy of Business Disciplines since 2002. He has published thirty authored or co-authored peer-reviewed journal articles. He conducts research on a wide variety of topics and utilizes quantitative, qualitative and mixed-methods approaches. He recently published an open-access book, *Communication and Humility: A Journey*, and is the Founder and CEO of Stat-Tree, LLC.

You have previously published in QRBD. Why do you think it is important to review for journals in which one has previously published?

The Quarterly Review of Business Disciplines has grown as a journal. I have served as a reviewer and have published a few articles in this journal since its inception. I assisted in the development of the journal recommending guidelines for formatting including the use of the American Psychological Association's Publication Guidelines and the peer-review process. I believe in giving back to the IABD through this participation for the support of my colleagues and the growing recognition of its premiere journal.

Your background is in communications. What role do you think communications plays in today's business curriculum?

Although Communication as a discipline is typically housed in either the humanities or social sciences, the discipline has much in common with business fields such as Marketing and Management. More specifically, Communication studies issues of importance to businesses including interpersonal, intercultural, and organizational communication. As organizations are comprised of human beings who need to interact with each other and with persons outside of the organization, communication is integral to success for meeting the organization's goals.

REVIEWER SPOTLIGHT

Yuri Hupka

Dr. Yuri Hupka is an Assistant Professor of Finance at Oklahoma City University. Yuri's research focuses upon executive compensation, supply chains, and financial market decentralization and has been published in journals such as *Journal of Commodity Markets* and *Finance Research Letters*. He has also presented his research at academic conferences including the Financial Management Association and Global Finance Association meetings, and to practitioners and policy-makers at many global energy conferences.

This was your first time reviewing for *QRBD*. What role do you think interdisciplinary journals play in today's research landscape?

Interdisciplinary journals, such as QRBD, play an important role in the academic landscape. They provide an outlet for research that integrates perspectives and approaches across fields. Sometimes even innovative ideas and "hot topics" may be overlooked because they do not fit the mold of a traditional journal but can find an audience in interdisciplinary journals such as QRBD.

You recently earned your PhD. What advice would you give to a newly minted PhD. regarding the role of journal reviewing in their service agenda?

I would tell new PhDs and graduate students that reviewing is always a valuable experience. When writing a research work, it is easy to be insular and focus only on your own perspective. Of course, you know what you are trying to say, you wrote it! By scrutinizing research from a review perspective, you gain invaluable insights into effectively formulating research to engage an academic audience. Additionally, it often leads to generating interesting research ideas of your own!

TRUST AND DISTRUST IN ARTIFICIAL INTELLIGENCE (AI) AGENTS: A CONSTRUAL-LEVEL PERSPECTIVE

Liqiong Deng, University of West Georgia

ABSTRACT

As Artificial Intelligence (AI) technologies are becoming ubiquitous in the modern world, AI agents have been increasingly adopted to serve various roles in our daily lives, such as personal assistant, salesperson, customer service agent, and virtual counselor. Thus, interacting with AI agents has become an everyday activity, which has received much research attention. Addressing the need to understand the interaction between humans and AI, this paper develops a research model of how user experience with AI agents influences users' trust and distrust in AI agents. More specifically, it categorizes the attributes of user experience with AI agents as process-related vs outcome-related. Drawing on the two-factor theory, construal level theory (CLT), and IS success and AI trust research, the research model proposes the differential effects of process-related and outcome-related attributes of AI user experience on users' trusting and distrusting beliefs in AI agents that are moderated by users' construal levels as well as the subsequent effects of trusting and distrusting beliefs on continued intention to use AI agents. In addition, the research model suggests that a construal fit between users' perception of AI agents and their AI usage context will increase their trusting belief in AI agents. By providing an understanding of the role of construal fit in promoting trust and the psychological mechanism by which various attributes of AI user experience differentially influence users' trust and distrust in AI agents, this paper will offer guidelines on how to appropriately design and implement AI agents to enhance trust and minimize distrust.

Keywords: artificial intelligence, construal level, trust, distrust

INTRODUCTION

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and act like humans (Bansal, Pruthi & Singh, 2022). AI Agents are intelligent nonhuman agents (Kim & Duhachek, 2020) that have been increasingly adopted to serve various roles in our daily lives, such as personal assistants, salespersons, customer service agents, virtual counselors, and etc. AI agents encompass a fusion of mathematical algorithms and systems designed to interact with humans and conduct tasks that were previously only performed by humans (Jackson, 2019; Kim & Duhachek, 2020). AI agents are capable of acting, reacting and cooperating much like humans do (Russell & Norvig, 2009). AI has been developed from a narrow concept of intelligence focused on task performance to a broader concept known as super AI, which is expected to integrate social skills and more complex problem-solving and creation (Kaplan & Haenlein, 2019). One key distinguishing factor between automated IT systems and AI agents lies in the AI agents' ability to learn and independently recommend solutions to humans (Szolovits, 2019).

Despite the advances in AI technologies and their applications across a variety of platforms and applications, research has shown many people are still averse to interactions with AI agents

(Dietvorst, Simmons & Massey, 2015). This reluctance could be due to the uncanny valley effect (Mori, MacDorman & Kageki, 2012), job displacement fears (Frey & Osborne, 2017), privacy and security concerns (Bélanger & Crossler, 2011), challenges of establishing emotional connections with AI (Picard, 1997), and lack of trust in AI decision-making (Lee & See, 2004). This research will focus on investigating the factors influencing people's trust and distrust in AI agents that have important implications for improving users' interactions with AI agents and increasing intentions to use AI agents. Prior research suggests that user experience is closely related to users' subjective evaluations of the interaction with a system (Hassenzahl & Tractinsky, 2006; Knijnenburg, Willemsen, Ganter, Soncu & Newell, 2012). User experience plays a crucial role in shaping users' trust and distrust in AI agents and their continued intention to use such agents. For instance, a positive user experience can foster trust and encourage continued usage, while a negative one can engender distrust and discourage further usage. So, this research aims to develop a research model of how user experience with AI agents influences users' trust and distrust in AI agents as well as their continued intention to use AI agents. By understanding how users evaluate various attributes of their experience with AI agents to form trusting and distrusting beliefs as well as continuous intention in AI agents, this research can guide the development of AI agents that maximize user trust, minimize distrust, and promote sustained usage. The remainder of this paper is structured as follows. It first reviews the existing literature on the two-factor theory, construal level theory (CLT), and IS success and AI trust research. Then, it presents the research model and its associated propositions. In the end, the expected contributions of this paper are discussed.

THEORETICAL BACKGROUND

Trust and Distrust

Lewicki, McAllister, and Bies (1998) theorize that trust and distrust are two separate constructs. This proposition is substantiated by the possibility of trust and distrust coexisting in a state of inconsistency. Consistency would entail either high trust and low distrust, or low trust and high distrust. Inconsistency, however, implies a simultaneous presence of high trust and high distrust or low trust and low distrust. Lewicki and his colleagues also argue that trust and distrust are distinct factors with unique antecedents and outcomes. Similarly, Sitkin and Roth (1993) assert that trust and distrust are distinct constructs. They define trust as confidence in an individual's ability or competence to carry out a specific task under certain circumstances. In contrast, distrust is described as the belief that a person's motives or values will lead them to behave inappropriately across situations.

Kramer (1999) also advocates the idea that trust and distrust have different antecedents and consequences. Komiak and Benbasat's (2008) work further strengthens this viewpoint by theoretically postulating and empirically verifying a dual-process perspective. They propose that the processes building trust and distrust are distinct and separate. In the context of recommendation agent (RA) usage, trust (or distrust) is the positive (or negative) expectation regarding the RA's conduct, including its interface, explanations, and recommendations. A trust-building (or distrust-building) process involves a user's favorable (or unfavorable) interpretation of interactions with an RA, leading to a positive (or negative) expectation of the RA's reliability for shopping decisions. McKnight et al. (2002) define trusting beliefs as the perceptions of positive attributes of the other party, which commonly encompass benevolence, integrity, and competence. Mayer et al. (1995)

further describe benevolence as the belief in a trustee's goodwill toward the trustor beyond self-interest. Integrity is seen as the trustee's adherence to acceptable principles, and competence is the belief in the trustee's skills and abilities to have influence within a particular domain.

Conversely, distrust is more than just low trust or lack of trust; it's the active belief that the other party will act detrimentally to one's welfare and security (Cho, 2006). Distrusting beliefs, as per Lewicki et al. (1998), are beliefs about the other party's negative attributes, including malevolence, deceit, and incompetence (Moody, Lowry & Galletta, 2010). I define malevolence, based on the work of Moody et al., (2010), as the belief that the trustee intends to cause harm, deceit as the belief in the trustee's dishonesty and potential dissemination of false information, and incompetence as the belief in the trustee's inability to complete a task.

Two-Factor Theory

The Two-Factor Theory, also known as Herzberg's Motivation-Hygiene Theory (Herzberg, Mausner & Snyderman, 1959), provides a unique lens through which one can study trusting and distrusting beliefs. Initially developed by Frederick Herzberg to analyze job satisfaction, the theory posits that factors contributing to positive attitudes (like job satisfaction) are different from those leading to negative attitudes (like job dissatisfaction) (Herzberg et al., 1959). According to the theory, motivating factors, also known as satisfiers, are elements that lead to job satisfaction and motivate employees to work harder. These factors often relate to the work itself and include aspects like achievement, recognition, work responsibility, advancement, and growth. Conversely, hygiene factors, also known as dissatisfiers, are conditions that, if absent or inadequate, cause dissatisfaction but, if met or exceeded, do not necessarily increase satisfaction. These factors typically pertain to the job environment and include company policies, supervision, working conditions, salary, and relationships with colleagues (Herzberg et al., 1959). In general, motivating factors provide individuals with a sense of achievement and enable them to experience personal growth, while hygiene factors relate to individuals' inherent drive to avoid pain from the environment (Herzberg, 1968).

Herzberg's Two-Factor Theory has traditionally been employed to study job satisfaction and dissatisfaction. However, its fundamental premise — that positive and negative attitudes are influenced by different factors — makes it applicable to other areas, including the study of trust and distrust. The Two-Factor Theory has also been used to investigate web design quality and service process quality (Johnston, 1995; Loiacono, Watson & Goodhue, 2007; Ou & Sia, 2009, 2010). Prior research shows that similar to job satisfaction and dissatisfaction, trust and distrust may also be influenced by different factors (Komiak & Benbasat, 2008; Ou & Sia, 2010). For instance, quality of communication and transparency of an AI system might enhance trust (motivating factor), while poor performance and low reliability might foster distrust (hygiene factor) (Bélanger & Crossler, 2011; Lee & See, 2004; Siau & Wang, 2018). Lewicki et al. (1998) argue that “there are elements that contribute to the growth and decline of trust, and there are elements that contribute to the growth and decline of distrust” (p. 440). This is consistent with the premise of Two-Factor Theory that certain factors will be more likely to affect positive-valent perceptions, while other factors will be more likely to affect negative-valent perceptions (Ou & Sia, 2010). Therefore, the Two-Factor Theory can serve as a valuable framework for understanding the factors that influence trusting and distrusting beliefs and provide insights for improving user experiences and trust in AI agents.

Process/Outcome Attributes of User Experience

This research focuses on the user experience with AI agents, because user experience is widely acknowledged as performing a predominant role in trust formation (Xingyuan, Li & Wei, 2010). User experience encompasses the holistic experience that a user has when interacting with a system (Hassenzahl & Tractinsky, 2006), which in this case refers to AI agents. A well-designed user experience can help foster trust and mitigate distrust (Bélanger & Crossler, 2011; Lee & See, 2004). The concept of user experience is dynamic and multi-dimensional, incorporating various evaluative aspects such as process-related attributes and outcome-related attributes (Forlizzi & Battarbee, 2004; Law, Roto, Hassenzahl, Vermeeren & Kort, 2009).

Process-related attributes refer to the elements associated with the interaction process with an AI agent aimed at accomplishing specific tasks. These attributes often include aspects like ease of use, controllability, quality of communication, sociability, and transparency. Ease of use is the simplicity/ease with which a user can navigate and interact with the system, and it is one of the most influential factors for user satisfaction and adoption (Davis, 1989). Controllability refers to the user's perceived control over the interaction with the AI agent (Novak, Hoffman & Yung, 2000). The quality of communication relates to the clarity, accuracy and relevance of the information exchanged between the user and the AI agent (Jiang, Benbasat & Wang, 2018). Sociability refers to the AI agent's ability to exhibit social behaviors that facilitate human-like interactions (Cassell, 2000). Transparency involves the AI system's ability to make its operations and decision-making processes understandable to users (Turtle, 2011).

Outcome-related attributes, on the other hand, are associated with the AI agent's performance. These include the AI's competence in completing tasks and doing so in a timely, consistent, and reliable manner (Siau & Wang, 2018). Factors such as usefulness, effectiveness, helpfulness, efficiency, and reliability come under this category (Knijnenburg, Willemsen, Ganter, Soncu & Newell, 2012; Schaefer, Chen, Szalma & Hancock, 2016). Usefulness denotes the degree to which the AI agent can enhance the user's task performance (Davis, 1989). Effectiveness refers to how accurately and successfully AI performs tasks and achieves its set goals (Haenssle et al., 2018). Helpfulness refers to the extent to which AI can assist users in achieving their goals or solving problems (VanLehn, 2011). Efficiency refers to the capability of AI to achieve its goals with minimal use of resources, such as time, energy, or computational power (Rajkomar, Dean & Kohane, 2019). And reliability is the consistency of the AI agent's performance (Parasuraman, Zeithaml & Malhotra, 2005).

Prior research indicates that process-related attributes can be classified as motivating factors, while outcome-related attributes can be regarded as hygiene factors. This classification is in line with the Two-Factor Theory (Herzberg, 1964). The process-related attributes are identified as motivating factors because a high-quality interactive process with technology leads to a more positive attitude (e.g., increased trust), while a lower quality process tends to result in a less positive attitude (e.g., decreased trust) (Beldad, de Jong & Steehouder, 2010). However, lower quality processes do not significantly influence negative attitudes, as users are generally more tolerant of a "not-so-good" interactive process than of poor outcomes (Verhagen, van Nes, Feldberg & van Dolen, 2014).

In contrast, outcome-related attributes are seen as hygiene factors because they are considered as “must-haves” and are deemed a basic and essential part of the technology (Lankton, Wilson & Mao, 2010). Users are generally unwilling to accept poor performance, such as inaccurate or incomplete results. Poor performance can lead to dissatisfaction and increased distrust in the technology (Bhattacharjee, 2001). Consequently, the outcome-related attributes have a stronger influence on distrust than on trust. Distrust increases as the AI agent’s performance worsens and decreases as the performance improves (Pavlou & Gefen, 2004).

Construal Level Theory (CLT)

This research draws on the Construal-Level Theory (CLT) (Trope & Liberman, 2003, 2010) to examine how people’s mental representation styles influence their evaluation of process vs outcome-related attributes of AI user experience. CLT describes how the same event or entity can be interpreted in different ways (e.g., via abstract and high-level versus concrete and low-level mental representations). These distinct interpretations influence what kind of information individuals focus on, how they process that information, and ultimately their decisions and actions regarding that event or entity. CLT is well-suited for providing insight into users’ information processing style because it explains how people “make predictions, evaluations, and choices with respect to [their] construal of objects rather than the objects themselves” (Liberman & Trope, 2008, p. 1204). The level of construal that people utilize to process information shapes the kind of information they pay attention to and how they interpret it (Trope & Liberman, 2010).

The term *construal* refers to the way individuals perceive, comprehend, and interpret the world around them, particularly how they understand and make sense of events, actions, and objects (Trope & Liberman, 2003). It captures not only their thoughts and beliefs but also their affective, motivational, and behavioral orientations (Griffin & Ross, 1991; Mischel & Shoda, 1995). Construals may vary from highly abstract (high-level) to highly concrete (low-level) interpretations (Trope & Liberman, 2010), which profoundly alter how information is processed. High-level construals are abstract, decontextualized representations that capture the central, core features of an event or object. High-level construals are coherent and broad, and emphasize the “why” aspects - the purpose, desirability, or goal of an action or event. They are not tied to a particular context and are therefore more stable across different settings. High-level construals help individuals make sense of actions and events in a broad, overall manner without getting bogged down in the specific, incidental details. With a high-level construal, people are future oriented and focused on the desirability of distal end-states and the meaning of their actions (i.e., why actions are taken). Low-level construals, on the other hand, are concrete, detailed, and context-bound representations that include the peripheral and incidental features of an event or object. They are more focused on the “how” aspects - the means, feasibility, or process involved in an action or event. Low-level construals offer a more detailed, nuanced perspective that is attuned to the particular circumstances of a situation. So, a low-level construal “tends to contract people’s mental horizons; it focuses their attention on the unique and idiosyncratic demands of present circumstances” (Wiesenfeld, Reyt, Brockner & Trope, 2017, p. 369). People using a low-level construal are oriented towards the present, vigilant in avoiding losses, and centered on the feasibility of short-term goals as well as the means for attaining them (i.e., how actions are performed) (Liberman & Trope, 1998). High- and low-level construals reflect opposing styles of information processing, and hence they are mutually exclusive.

Construal levels can be determined by individual and situational factors. Individuals may have a chronic tendency toward different levels of construal (Freitas, Salovey & Liberman, 2001; Vallacher & Wegner, 1989). As Vallacher and Wegner (1989) note, "...at one extreme is the low-level agent, someone who operates on the world primarily at the level of details. This person tends to approach an action with its mechanistic components in mind. At the other extreme is the high-level agent, someone who routinely views his or her action in terms of causal effects, social meanings, and self-descriptive implications" (p. 661). In addition, prior research has shown that psychological distance is a primary determinant of construal level (Trope & Liberman, 2003, 2010). For example, individuals tend to use detailed and concrete mental models (low-level construals) when contemplating events in the near future. Conversely, they utilize more abstract and generalized mental models (high-level construals) when considering events in the distant future (Trope & Liberman, 2000).

CLT (Trope & Liberman, 2003, 2010) also proposes a positive, reciprocal relationship between psychological distance and the level of abstraction at which a target is construed (i.e., construal level). CLT (Trope & Liberman, 2010) suggests that people represent events at varying levels of abstraction as a function of psychological distance (i.e., the removal of an event from direct experience). CLT's basic premise is that the more psychologically distant an event is, the more it will be represented at higher levels of abstraction. According to Trope and Liberman (2010), "Psychological distance refers to the perception of when an event occurs, where it occurs, to whom it occurs, and whether it occurs (p. 442)." So, there are four dimensions of psychological distance. The first dimension of temporal distance refers to the time that separates an event from the individual's present moment. The more distant the event in time, the more abstractly it is likely to be construed. The second dimension of spatial distance refers to the physical distance between an individual and an event or object. Events or objects that are far away are thought of in more abstract terms than those that are near. The third dimension of social distance involves the psychological gap between the self and others. This can pertain to interpersonal relationships (e.g., strangers versus friends) or social groups (e.g., out-groups versus in-groups). Greater social distance leads to more abstract construals. And the fourth dimension of hypotheticality refers to the likelihood of an event occurring. The less likely an event is to occur, the more psychologically distant and abstract it appears.

According to CLT, all stimuli encompass two attributes: central attributes and peripheral attributes (Liberman, Trope & Wakslak, 2007; Trope & Liberman, 2010). The central attributes of a stimulus serve to define the core characteristics or purpose of the stimulus, embodying the "what" or "why" descriptions of the stimulus, and they include features that are associated with the primary goal or actions (Higgins & Trope, 1990; Kruglanski, 1975). On the other hand, the peripheral attributes refer to the "how" description of the stimulus. They are the secondary characteristics or aspects of a stimulus, which, although not defining the essence of the stimulus, are important for its comprehensive understanding and evaluation. These attributes typically outline how a particular function or action is executed and provide additional, often contextual, details that enrich our understanding of the central entity. The "what" and "why" aspects of the stimulus correspond to the superordinate level (Liberman, Sagristano & Trope, 2002) while the "how" aspects are associated with the subordinate level of stimuli identification (Vallacher & Wegner, 1987).

As the psychological distance between the stimulus and the user – be it temporal, spatial, social, or hypothetical – changes, so does the user's evaluation of the stimulus, based on the differential

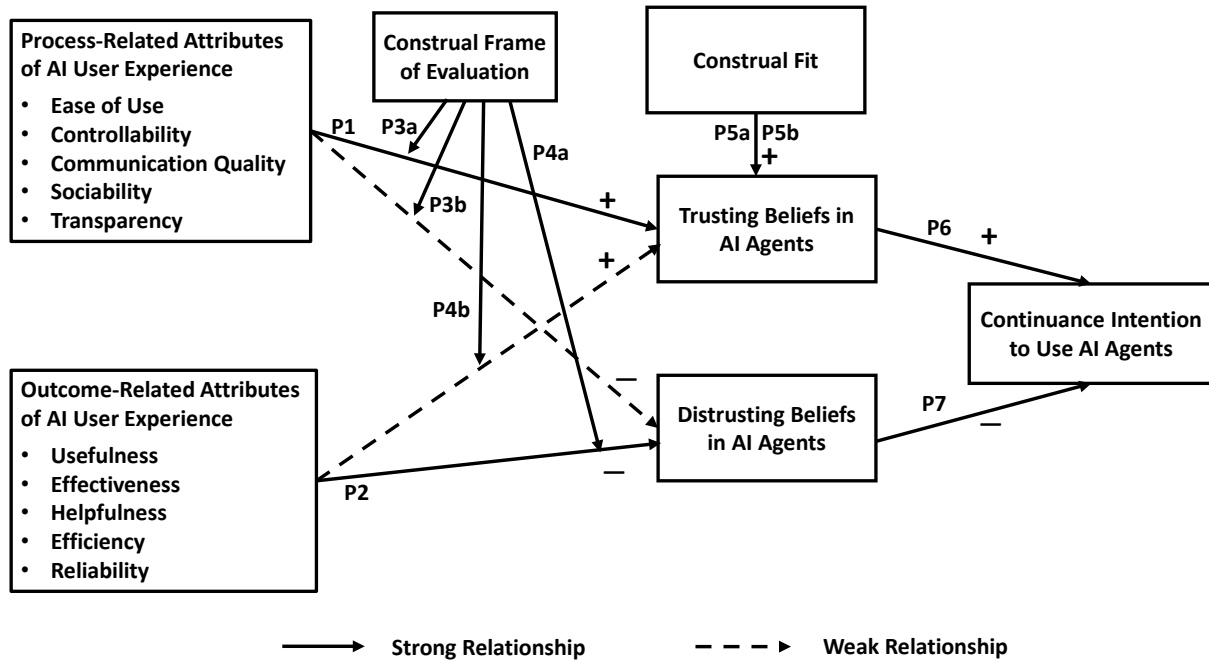
importance of the stimulus' central or peripheral features in the user's mental model (Trope, Liberman & Wakslak, 2007). An increase in distance leads to reduced importance associated with peripheral or ancillary details, shifting people's focus towards the essential or central features of the stimulus. Thus, individuals use abstract mental models to construe psychologically distant stimuli with high-level and decontextualized representations by focusing on the general core features, denoting high-level construals. Conversely, close proximity to the stimulus allows users to adopt a more detail-oriented perspective, which directs more attention to the details related to the peripheral features of the stimulus. Hence, people use concrete mental models to construe psychologically proximate stimuli with low-level and contextualized representations by concentrating on the specific detailed features, representing low-level construals. In conclusion, a high construal level is associated with the information processing of superordinate or central aspects of the stimulus, while a low construal level corresponds to the processing of subordinate or peripheral components of the stimulus (Trope & Liberman, 2000).

In terms of the user experience with AI agents, the outcome-related attributes can be regarded as central attributes, as they define the “what” and “why” of the interaction: what the AI agent can achieve and why it's useful. These are the primary characteristics that determine the value and utility of the AI agent – its “what” or “why”. Users interact with AI agents with specific objectives in mind, and these outcome-related attributes are essential for fulfilling those objectives. Thus, these attributes are associated with the superordinate level of stimuli identification and reflect the AI agent's overall performance and effectiveness, which are likely to be evaluated better with a high construal frame. On the other hand, the process-related attributes can be considered peripheral attributes. These attributes describe “how” the user interacts with the AI agent, such as the ease of use, controllability, communication quality, etc. Although they contribute to the overall experience, they are secondary to the main goal of utilizing the AI agent. Hence, these aspects are linked to the subordinate level of stimuli identification and depict the operational details and procedures of the interaction, which would require a low construal frame to assimilate the information. Therefore, AI users are expected to assign relatively more importance to process-related attributes when evaluating an AI agent under a low-level construal and attribute greater significance to outcome-related attributes under a high-level construal.

RESEARCH MODEL AND PROPOSITIONS

Drawing on the Two-Factor Theory, CLT, and IS success and AI trust research, this paper proposes a research model of how user experience with AI agents influences users' trust and distrust in AI agents (Figure 1). It classifies the characteristics of user experience with AI agents into two categories: those related to the process and those related to the outcome. It suggests that these process-related and outcome-related attributes of the AI user experience have distinct effects on users' trusting and distrusting beliefs in AI agents. These effects can be moderated by the users' construal frames of evaluation and subsequently impact their continued intention to use AI agents. Moreover, the research model proposes that when there's a match— “construal fit”—between how users perceive AI agents and their construal frame of evaluation, it can enhance their trusting beliefs in AI agents.

Figure 1. Research Model of the Effects of User Experience Attributes on Trust, Distrust and Continuance Intention in AI agents



The Two Factor Theory suggests the asymmetric effects of process-related and outcome-related attributes of AI user experience on trusting and distrusting beliefs in AI agents. Process-related attributes, such as the ease of use, controllability, communication quality, sociability, and transparency of an AI agent, are factors that contribute to the interaction between the user and the AI agent. They are often seen as motivating factors that enhance users' positive attitudes towards and engagement with the AI agent (Vermeeren, Law, Roto, Obrist, Hoonhout & Väänänen-Vainio-Mattila, 2010). So, they primarily contribute to the development of trusting beliefs. The higher the quality of these attributes, the more likely users are to develop trust in the AI agent (Beldad, De Jong & Steehouder, 2010; Lee & See, 2004). For instance, if an AI agent is easy to use, transparent, and communicates clearly, it can foster a sense of confidence in the system, leading to increased trust. However, these process-related attributes might not have a considerable impact on reducing distrust, because even if the process is user-friendly, clear and smooth, users could still harbor distrust due to some outcome-related issues. Even if these attributes are of lower quality, they might not necessarily lead to strong distrusting beliefs, as users can be more tolerant of a suboptimal interactive process as long as the outcome meets their needs and expectations (Bhattacharjee, 2001).

On the other hand, the outcome-related attributes related to the AI agent's performance, such as usefulness, effectiveness, reliability, helpfulness, and efficiency, primarily serve to diminish distrusting beliefs rather than increase trusting beliefs (Herzberg, 1964), because these attributes are considered "must-haves" and act as hygiene factors, which, when absent or inadequate, can lead to negative attitudes, such as dissatisfaction or distrust (Herzberg, 1964; Kim, Ferrin & Rao, 2008). For example, if an AI agent makes errors or fails to complete tasks effectively, users may perceive the agent as unreliable or untrustworthy and start distrusting the system (Bhattacharjee, 2001; Gefen, Karahanna & Straub, 2003). If an AI agent consistently delivers accurate results and

exhibits reliable performance, users' potential fears and doubts (distrusting beliefs) about the system are likely to decrease. However, even if the AI agent performs well, it does not necessarily mean that users will develop strong trusting beliefs, as good performance is often taken for granted (Oliver, 1980). Users may simply consider performance as an expected standard (Benbasat, Gefen & Pavlou, 2008) rather than a source of increased trust.

Therefore, the process-related attributes of AI user experience seem to play a more significant role in building trusting beliefs, while outcome-related attributes play a more critical role in mitigating distrusting beliefs. This suggests the following propositions.

Proposition 1: Process-related attributes of AI user experience have an asymmetric effect on trusting beliefs and distrusting beliefs; they act more to increase trusting beliefs than to decrease distrusting beliefs in AI agents.

Proposition 2: Outcome-related attributes of AI user experience have an asymmetric effect on trusting beliefs and distrusting beliefs, they act more to decrease distrusting beliefs than to increase trusting beliefs in AI agents.

CLT posits that psychological distance influences how people perceive, comprehend, and evaluate objects and events (Trope & Liberman, 2010). It suggests that individuals use two types of mental representations: high-level construals (abstract, schematic, and decontextualized representations) for distal stimuli, and low-level construals (detailed, specific, and contextualized representations) for proximal stimuli. In the context of AI user experience, it can be argued that process-related attributes are associated with low-level construals, while outcome-related attributes are linked with high-level construals. Process-related attributes, such as ease of use, controllability, communication quality, sociability, and transparency, are closely tied to the immediate interaction between users and AI agents, which users can evaluate in a detailed and specific manner. On the other hand, outcome-related attributes, such as usefulness, effectiveness, helpfulness, efficiency, and reliability, are often viewed in a higher-level and more abstract manner. So, users' construal levels can have important implications for how they process and respond to different aspects of AI agents when interacting with them. For instance, the construal frames of evaluation adopted by users of AI agents can affect the importance that users place on the process- or outcome-related attributes of AI user experience. Individuals adopting a high-level construal frame of evaluation often care more about the overall outcomes rather than the specific steps or processes involved in achieving those outcomes, and hence tend to place more emphasis on the outcome-related attributes, such as the performance of AI agents. Whereas individuals adopting a low-level construal frame of evaluation focus on the specific details of how to use AI agents to achieve tasks, and thus tend to place more emphasis on the process-related attributes, such as the ease of use, controllability, communication quality and so on.

In the context of AI agent usage, users may form different construal frames based on their usage contexts. For instance, if the AI interaction is immediate (temporally proximate), with a close friend (socially proximate), in the same room (spatially proximate), and certain to occur (high probability), it might induce a low-level construal frame of evaluation. For example, if you are using a smart speaker like Amazon's Alexa in your living room to play music or ask for the weather forecast, this situation is temporally, spatially, and socially proximate and certain to occur, leading to a low-level construal frame. In this scenario, you will focus more on the concrete and immediate details of the interaction process (such as Alexa's easiness of use, voice clarity, response speed,

and friendliness), which are characteristics of a low-level construal. On the contrary, if you are using an AI investment advisor to manage your retirement savings ten years from now, this situation is temporally distant, socially distant (as it's impersonal), and uncertain (as market conditions can vary), leading to a high-level construal frame. In this case, you might focus more on the abstract and ultimate outcomes of the interaction (e.g., the expected return on investment and the AI advisor's past performance), which are characteristics of a high-level construal. In sum, the usage contexts of AI agents can shape users' construal frames of evaluation, which in turn influence their focus on the process- or outcome-related attributes of user experience and moderate the effects of these attributes on users' trusting and distrusting beliefs in AI agents.

Based on the above reasoning, the following propositions can be formulated.

Proposition 3: Process-related attributes of AI user experience have a) a stronger positive influence on users' trusting beliefs and b) a stronger negative influence on users' distrusting beliefs in AI agents under a low-level construal frame than a high-level construal frame of evaluation.

Proposition 4: Outcome-related attributes of AI user experience have a) a stronger negative influence on users' distrusting beliefs and b) a stronger positive influence on users' trusting beliefs in AI agents under a high-level construal frame than a low-level construal frame of evaluation.

Prior research has shown that people's mental representations of AI agents may be construed at different levels depending on people's beliefs about AI's learning capabilities (Kim & Duhachek, 2020). People tend to perceive AI agents as low-level construals when they hold a lay theory that AI agents do not have superordinate goals and cannot learn from their experiences or possess consciousness like humans do, because they are considered as fixed-capability machines that can follow only preprogrammed algorithms (Kim & Duhachek, 2020). In contrast, when individuals view AI agents as advanced, autonomous entities capable of complex problem-solving and learning via prior experiences, they are likely to infer greater superordinate goals from AI agents and consider them as high-level construals (Kim & Duhachek, 2020).

When a user's mental representation of an AI agent aligns with his/her construal frame of evaluation to achieve a construal fit, he/she is likely to process information from the AI agent more fluently. This is because the AI agent's behavior is in line with the user's expectation and cognitive framework, making it easier for him/her to understand and predict the AI agent's actions. Information that is easier to process tends to be perceived as more familiar, more pleasant, and more truthful (Reber, Winkielman & Schwarz, 1998; Winkielman, Schwarz, Fazendeiro & Reber, 2003). So, the processing fluency resulting from the construal fit between the users' perception of AI agents and their construal frame of evaluation will make the users feel more pleasant interacting with the AI agent and perceive the AI agent as more reliable, which in turn leads to increased trust. Furthermore, the construal fit induces a "feeling right" experience. This feeling of appropriateness can function as a source of information, as per the "feeling-as-information" theory (Schwarz & Clore, 2007), which suggests that people draw inferences from their feeling right experience, resulting in more favorable evaluations (Avnet & Higgins, 2006; Camacho, Higgins & Luger, 2003; Higgins, Idson, Freitas, Spiegel & Molden, 2003). In the context of AI usage, the "feeling right" experience due to a construal fit can generate a sense of trustworthiness about the AI agent because

users interpret their “feeling right” as a signal that their interaction with the AI agent is going well and therefore, the agent can be trusted.

For example, when interacting with an AI agent, a user with a high-level construal frame of evaluation might focus on the agent’s potential for learning, growth, adaptability, and its ability to provide personalized solutions. If this user perceives the AI system as a high-construal entity capable of learning and improving over time, they are more likely to trust the AI agent. This is because their high-level big-picture thinking aligns with the AI’s perceived capabilities, creating a feeling of appropriateness and a sense of confidence in the AI’s ability to perform tasks efficiently and effectively. On the other hand, a user with a low-level construal frame of evaluation focuses on concrete and specific aspects when evaluating a situation or an object. So, when interacting with an AI agent, this user might focus on the specific tasks the AI can perform and the immediate outcomes the AI provides. If this user perceives the AI agent as a low-construal machine with fixed capabilities to perform specific, repetitive tasks, he/she may trust the AI agent more because he/she feels right about relying on the agent that consistently delivers the expected results.

Therefore, the following propositions are suggested.

Proposition 5: A construal fit between users’ perception of AI agents and their construal frame of evaluation increases their trusting beliefs in AI agents.

Proposition 5a: When users perceive AI agents as lower-level construals, they will have greater trusting beliefs in AI agents under a low-level construal frame than a high-level construal frame of evaluation.

Proposition 5b: When users perceive AI agents as high-level construals, they will have greater trusting beliefs in AI agents under a high-level construal frame than a low-level construal frame of evaluation.

Trust and distrust play crucial roles in shaping users’ attitudes toward AI agents and their intention to continue using them. Trusting beliefs in AI agents refer to the perception that the AI systems have positive attributes such as competence, integrity, and benevolence (McKnight, Choudhury & Kacmar, 2002). In contrast, distrusting beliefs denote negative attributes such as incompetence, deceit, and malevolence (Lewicki, McAllister & Bies, 1998).

Prior research has shown that trust positively impacts users’ intention to continue using technology and increases user satisfaction (Bhattacharjee, 2001; Gefen, Karahanna & Straub, 2003). Trusting beliefs in AI agents can foster a sense of confidence and reliability in the system, leading users to continue using the AI agents for various tasks. For example, when users perceive an AI-driven recommendation system as trustworthy, they are more likely to rely on its suggestions and continue using the platform (Xu, Benbasat & Cenfetelli, 2013).

On the other hand, distrust negatively influences continuance intention and can lead to avoidance or abandonment of technology (Cho, 2006; Lewicki, McAllister & Bies, 1998). If users believe that AI agents possess negative attributes such as deceit or incompetence, they are less likely to continue using the AI agents, fearing potential harm, misinformation, or poor performance. For instance, distrust in AI medical diagnosis systems may prevent patients from accepting the system’s recommendations, impacting their intention to continue using such systems (Abdul, Vermeulen, Wang, Lim & Kankanhalli, 2018). So, trusting beliefs in AI agents are likely to have a positive impact on users’ continuance intention, while distrusting beliefs can lead to a negative

influence on the intention to keep using AI agents. And the following propositions can be formulated:

Proposition 6: Trusting beliefs in AI agents will positively influence continuance intention to use AI agents.

Proposition 7: Distrusting beliefs in AI agents will negatively influence continuance intention to use AI agents.

DISCUSSIONS AND CONTRIBUTIONS

This paper proposes a research model of how user experience with AI agents influences users' trust and distrust in AI agents. The major contributions of this paper are as follows. First, this research draws on the Two-Factor Theory to differentiate between the process-related and outcome-related attributes of AI user experience and examine their differential effects on trusting and distrusting beliefs in AI Agents. Process-related attributes, classified as motivating factors, have stronger impacts on trusting beliefs, whereas outcome-related attributes, categorized as hygiene factors, have stronger impacts on distrusting beliefs. These asymmetric effects highlight the importance of both designing an interactive process that fosters trust and ensuring the AI agent's outcomes are reliable and effective to prevent distrust. Second, by applying CLT to AI user experience, this paper contributes to the understanding of the information-processing mechanism by which users' construal levels influence how AI users prioritize the process-related or outcome-related attributes of AI user experience in their evaluations of AI agents. It helps identify why some users may place more emphasis on the process of AI interaction (low-level construals) while others may care more about the overall outcomes of AI usage (high-level construals). Additionally, it also highlights the importance of construal fit between users' mental representations of AI agents and their construal frames of evaluation for increasing trust in AI agents. Finally, by providing an understanding of the role of construal fit in promoting trust and the psychological mechanism by which various attributes of AI user experience differentially influence users' trust and distrust in AI agents, this paper will offer guidelines on how to appropriately design and implement AI agents to enhance trust and minimize distrust. Incorporating these considerations into AI agent design can ensure that AI technologies are more widely accepted and adopted across various industries and applications. For example, an AI system designed for a user who is process-oriented should focus more on making it easy to use and control as well as transparent and understandable. In contrast, an AI system designed for a user who is outcome-oriented should focus more on ensuring its outcomes are accurate, useful, and reliable.

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EXTERNAL EMPLOYER BRANDING ACTIVITIES: TYPOLOGY DEVELOPMENT VIA INTEGRATION OF INFORMATION AMOUNT AND CONTENT

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ABSTRACT

An organization's employer branding activities strive to communicate to both external and internal stakeholders that it is a great place to work. This paper focuses on an organization's "external" employer branding activities (EEBAs) - recruitment messages used to attract job seekers in the external labor market. The competition for hiring skilled and qualified employees has increased over the years, and thus it is crucial for organizations to be able to attract job seekers and influence them in pursuing a position via appropriate EEBAs. While prior research has explored applicant attraction by considering separately the amount of information and attribute content in recruitment messages, this paper draws on marketing and consumer psychology literature to integrate these two related but theoretically distinct research streams and builds theory around four "external" employer branding activity (EEBA) types and their effectiveness. In addition, the feasibility of using different types of employer branding activities is discussed, based on industry, organization, and job-seeker characteristics.

Keywords: employer branding; elaboration likelihood model; instrumental-symbolic framework; recruitment messages

INTRODUCTION

Employers are progressively realizing the importance of attracting and retaining qualified and skilled employees to win the "war for talent" (Chapman et al., 2005; Kwon & Jang, 2022), and as such, research on "employer branding" has become salient over the years. As a process, employer branding differentiates an employer in the labor market (Backhaus, 2016) and can be summed up as an organization's efforts to communicate that the firm is a desirable place to work (Arasanmi & Krishna, 2019). Employer branding can be targeted at both prospective and current employees (Lievens, Van Hove & Anseel, 2007) and in this paper, I specifically focus on an organization's employer branding activities directed at prospective employees (i.e., external employer branding activities or EEBAs), since one of the 'central' goals of the employer-branding field is to 'ensure that an organization is identifiable and attractive to potential employees' (Edwards, 2009; pp. 7).

In understanding EEBA, two dimensions of marketing and branding behavior are important and relevant: 'information amount' (Collins, 2007; Collins & Han, 2004) and 'attribute content' (Cable & Graham, 2000; Lievens & Highhouse, 2003; Slaughter et al., 2004; Wilhelmy et al., 2019). I base my arguments on the Elaboration Likelihood Model (Petty & Cacioppo, 1981, 1983, 1986), the Instrumental-Symbolic framework (Lievens & Highhouse, 2003), and research on high and low amounts of information in recruitment messages (Collins, 2007; Collins & Kanar, 2014). Prior work has investigated applicant attraction by developing separate research streams on the amount of information and attribute content in recruitment messages. However, an in-depth perspective regarding the effectiveness of EEBAs can be developed by considering the joint effects of both these aspects on employee attraction to organizations. Considering

information amount or attribute content in isolation puts emphasis on only one side of the story and thus paints an incomplete and overly simplistic picture of the impact that recruitment messages would have on applicant attraction and subsequent job search behaviors.

As such, I integrate recent theoretical work into a typology that characterizes and parametrizes EEBA's. Specifically, I identify four types: (1) High Information-Instrumental, (2) High Information-Symbolic, (3) Low Information-Instrumental, and (4) Low Information-Symbolic. By crafting a typology, I identify different EEBA dimensions, highlighting the advantages and disadvantages of each type. In addition, I also build theory around the effectiveness and suitability of, using such EEBA types. This is also an important contribution to the recruitment literature as well as practice, inasmuch that the correct use of different EEBA will likely contribute to the success of an organization's recruitment efforts, and the success of different EEBA's may very well depend on the match and mismatch in cognitive processing of both information amount and attribute content. Additionally, the effectiveness of employer branding will depend on industry, organization, and individual-level characteristics, which is also discussed.

RECRUITMENT AND EMPLOYER BRANDING ACTIVITIES

The idea of attracting job seekers stems from the notion that employees are valuable resources for an organization, and can lead to sustained competitive advantage (Barney, 1991). Thus, it is a crucial strategic imperative for organizations to be able to attract job seekers and influence them in pursuing a position via recruitment activities. Employer branding messages act as a very important source of information in early stages of recruitment that assist in positively influencing potential employees' initial perceptions of the organization as an employer (Theurer et al., 2018).

In this paper I develop a typology of external employer branding activities (EEBA's), which represent recruitment messages intended to attract potential employees. Prior work has investigated applicant attraction by developing separate research streams on the amount of information (Cable & Turban, 2001; Collins, 2007; Collins & Han, 2004) and attribute content in recruitment messages (Lievens & Highhouse, 2003; Van Hove et al., 2013). However, as discussed below, both research streams are theoretically related but distinct, and I next integrate these theoretical works into a typology that characterizes and parametrizes EEBA's.

Information Amount in Recruitment Messages

While organizations can design messages to persuade job seekers to apply, Collins and colleagues (Collins, 2007; Collins & Han, 2004) argue that the effectiveness of such recruitment activities will depend on the amount of information in those messages and the extent of cognitive effort expended by job seekers while processing the information. Recruitment messages that provide large amounts of detailed, specific information regarding the job and the organization to potential applicants are examples of high-information recruitment practices (Collins & Han, 2004). These detailed messages contain important job and organizational information such as job requirements, salary, location, company culture, and growth opportunities. Conversely, recruitment activities can be designed to provide low amounts of information. Short recruitment messages, banner advertisements in websites, posters containing images and company logos that

provide general positive signals and cues regarding the organization as an employer are examples of low-information recruitment practices (Collins, 2007).

Attribute Content in Recruitment Messages

Job seeker's initial attraction to an organization is dependent on early impressions of an organization's image as an employer, defined as "the package of functional, economic and psychological benefits provided by the employment, and identified with the employing company" (Ambler & Barrow, 1996: 187). Lievens & Highhouse (2003) drew on the instrumental-symbolic framework from social and consumer psychology literature (Keller, 1993) to suggest that like product and service brand images, employer image can be separated into two primary components (1) instrumental attributes and (2) symbolic meanings.

Instrumental information in marketing messages describes a product in terms of tangible, objective, and physical attributes (Keller, 1998). Likewise, in the recruitment context, instrumental information in recruitment messages describe the job and the organization in objective, factual and concrete terms (Lievens & Highhouse, 2003). Examples of instrumental information include details about job requirements, pay, working hours, bonuses, benefits, and location (Cable & Graham, 2000; Wilhelmy et al., 2019). Job seekers form perceptions of person-job fit through instrumental information, i.e., the congruence between job requirements and individual abilities, and between the needs of the job seeker and the support provided by organization (Nolan et al., 2013).

In contrast, symbolic meanings in marketing messages describe the product in terms of subjective and intangible attributes, and consumers use these symbolic meanings to make inferences regarding the product (Keller, 1998). Similarly, symbolic information in recruitment materials describe employers in subjective terms and assist job seekers in ascribing personality traits and values to organizations in the early stages of recruitment (Lievens & Highhouse, 2003; Slaughter et al., 2004; Wilhelmy et al., 2019). Research has shown that applicants are attracted more to those organizations whose perceived traits match their own personality (Slaughter et al., 2004). The social identity theory (Ashforth & Mael, 1989) suggests that if job seekers develop positive perceptions toward an employer image, they are more likely to seek employment in the organization to enhance their own self-image via organizational memberships.

I bring together these perspectives on information amount and instrumental/symbolic attributes in recruitment messages to develop and propose a typology of EEBA that identifies four types: (1) High Information-Instrumental, (2) High Information-Symbolic, (3) Low Information-Instrumental, and (4) Low Information-Symbolic. The underlying implication is that employers can manipulate the information amount and content embedded in their EEBA to better differentiate themselves as they contend for employees. The theory linking these two dimensions of EEBA and thus motivating the typology proposed here is the Elaboration Likelihood Model (ELM).

ELABORATION LIKELIHOOD MODEL – CENTRAL AND PERIPHERAL PROCESSING

The ELM, a widely accepted framework to understand the effects of persuasive communication, argues that people develop cognitive responses (i.e., elaborations) when experiencing a marketing message (Petty & Cacioppo, 1981, 1983). Elaboration refers to the extent to which an individual spends time and effort to process the marketing message and carefully ponders the issue-relevant arguments contained in the message (Petty & Cacioppo, 1986). This framework suggests that when exposed to a recruitment message, individuals will process the message either centrally (i.e., the “central route of persuasion”) or peripherally (i.e., the “peripheral route of persuasion”).

Central and Peripheral Routes of Persuasion

The central route of persuasion involves expending considerable cognitive resources to carefully consider and process a message. Thus, when individuals process centrally, they evaluate the strength of the argument and assess the message deeply (Petty & Cacioppo, 1981, 1983). In contrast, when recipients use limited cues or visual images embedded in the message to develop perceptions and associations, they are said to be processing the message peripherally. As such, the peripheral route does not require high cognitive search costs or close scrutiny of the argument (MacInnis & Jaworski, 1989).

ELM and Amount of Information. The amount of information embedded in a recruitment activity will affect whether the message is processed centrally or peripherally. Applying ELM to the recruitment context, recruitment messages containing large amounts of information regarding the job and the employer are likely to be processed centrally by job seekers (Collins, 2007; Collins & Han, 2004; MacInnis & Jarowski, 1989). Such deep assessments may lead to favorable impressions and beliefs towards the employer organization that are likely to be long lasting. On the other hand, job seekers tend to process low-information recruitment practices peripherally, as those messages do not have enough information to elicit central processing (Collins, 2007; Collins & Kanar, 2014). Even if a job seeker is not actively considering a particular organization that is employing a low-information strategy, such practices can influence job seekers positively by communicating information that can be processed incidentally (Collins & Han, 2004). Therefore, based on the ELM framework, effectiveness of EEBAs would depend on the amount of information embedded in the message, which influences the extent of cognitive effort to be expended by job seekers to process the information (Collins, 2007; Collins & Han, 2004).

ELM and Attribute Content. The ELM suggests that messages containing instrumental attributes would require greater cognitive effort to be processed and thus must be processed centrally (Johar & Sirgy, 1991). To illustrate, consider a printed advertisement for a new car, which contains instrumental information on price. When reading the price amount, it is likely that the potential purchaser will generate many product-relevant thoughts such as “Is the price too high or too low? Is it high or low compared to other cars in the market? Am I willing to pay so much for this car?” etc. This simple illustration suggests that the consumer engages in deep assessment of the instrumental attribute of price by utilizing substantial cognitive resources. This central processing involving instrumental information is established by *functional congruity*, defined as

the match between perceived utilitarian (instrumental) aspects of a product and self-held ideal expectations of said instrumental aspects (Sirgy & Johar, 1985; Sop & Kozak, 2019). The greater the match between the instrumental attributes and the referent beliefs, the greater will be the impact on an individual's behaviors (Oliver & Bearden 1985).

Conversely, symbolic meanings describe the product in terms of subjective and intangible attributes, based on people's perceptions and inferences regarding the product, and the ELM suggests that such attributes are to be processed peripherally (Sirgy, Grewal & Mangleburg, 2000). For instance, a consumer may decide to purchase a car because it is trendy (symbolic attribute), and this trait may reflect the purchaser's self-concept. In contrast to instrumental attributes, symbolic information does not utilize substantial cognitive resources to be processed (Johar & Sirgy, 1991). Returning to the advertisement for a new car, assume that a consumer reads another marketing message that describes the car as "cool." When reading this symbolic description of the car, the consumer is likely to make an instant subjective judgement regarding the trendiness (or coolness) of the car, and this subjective assessment is carried out rapidly, without the need for many cognitive resources. This is an example of peripheral processing. Peripheral processing involving symbolic information is mediated by *self-congruity* (Johar & Sirgy, 1991; Sop & Kozak, 2019), defined as the extent to which an individual's self-image matches that of a typical brand user (Sirgy, 1982) and has been explained as being the fit between the consumer's beliefs and the brand's image or personality (Aaker, 1999). In the recruitment context, the greater this match, the more likely that a job seeker will have a favorable attitude towards the hiring organization, and this self-congruity process is cognitively less taxing than functional congruity.

EEBA TYPOLOGY

In this section, I integrate the theoretical perspectives on information amount, content, and ELM to develop the typology of EEBA's used by organizations to attract potential employees. Figure 1 depicts the four types identified: (1) High Information-Instrumental, (2) High Information-Symbolic, (3) Low Information-Instrumental, and (4) Low Information-Symbolic.

High Information-Instrumental EEBA's combine high-information and instrumental attributes in a recruitment message, and provides large amount of detailed, cogent information describing the instrumental attributes of the organization and the job. Interestingly, when we draw on the ELM framework to examine the cognitive pathways of information processing, we see in Figure 1 that large amounts of information will be processed centrally, and the underlying instrumental attributes are also processed centrally. This represents a "match" in cognitive processing, where both information amount and attribute content are being processed in the same manner. The greater this match, the more positive will be the potential employee's belief and preferences towards the hiring organization, which in turn should enhance job pursuit intentions (Johar & Sirgy, 1991).

Figure 1: EEBA Typology Representing Matches and Mismatches in Cognitive Processing Pathways

EEBA typology		
Attributes	Information amount	
	High Information	Low Information
Instrumental	C C	C P
Symbolic	P C	P P

Legend: C – Central Processing; P – Peripheral Processing

When we combine high-information recruitment messages and symbolic attributes, we observe the *High Information-Symbolic EEBA*. This EEBA type depicts an external employer branding activity that contains a great number of arguments portraying organizational symbolic information. As explained earlier, high-information recruitment practices involve providing potential applicants with detailed information regarding the job and the organization, and such large information amounts elicit central processing in individuals, while the symbolic information embedded in these messages are to be processed peripherally. Accordingly, there is a mismatch in cognitive processing when large amounts of information and symbolic attributes are considered.

Low-information recruitment practices do not contain enough information to elicit effortful central processing and thus must be processed peripherally, while instrumental information in recruitment messages describe the organization and the job in terms of factual, concrete attributes (Lievens & Highhouse, 2003). Integrating these two perspectives creates the *Low Information-Instrumental EEBA*, which represents a message containing low amounts of instrumental information regarding the job and the organization. This EEBA type also represents mismatch in cognitive processing pathways, inasmuch as low amounts of information must be processed peripherally, while the underlying instrumental content is processed centrally.

Finally, *Low Information-Symbolic EEBA* describes recruitment messages that contain low amounts of information and symbolic attributes. Since both dimensions of this EEBA require peripheral processing, this EEBA manifests a match in the cognitive mechanism required to process components of the recruitment message. Taking information amount and attribute content together suggests that *Low Information-Symbolic EEBA* should positively influence the attitudes and job pursuit intentions of job seekers. Table 1 below lists these EEBA types and describes the main attributes of each.

Table 1. Main attributes of EEBA types

EEBA type	Main attributes
High Information-Instrumental	- Provides high amount of information describing the instrumental attributes of the organization and the job. - Represents match in cognitive processing (Central-Central).
High Information-Symbolic	- Provides high amount of information describing the symbolic attributes of the organization. - Represents mismatch in cognitive processing (Central-Peripheral).
Low Information-Instrumental	- Provides low amount of information describing the instrumental attributes of the job and the organization. - Represents mismatch in cognitive processing (Peripheral-Central).
Low Information-Symbolic	- Provides low amount of information describing the symbolic attributes of the organization. - Represents match in cognitive processing (Peripheral-Peripheral).

ORGANIZATIONAL FAMILIARITY AND EEBA EFFECTIVENESS

I suggest that the effectiveness of the different EEBA's identified above, apart from information amount and content, will also be determined by an individual's motivation to process the message (Petty & Cacioppo, 1986). Research suggests when conditions are such that people have the motivation to allocate cognitive resources to process and scrutinize marketing messages carefully, elaboration likelihood is said to be high (Petty & Cacioppo, 1983). Conversely, when individuals lack the motivation to process or carefully consider the message's arguments, elaboration likelihood is low. However, an individual's motivation to process message content will depend on their familiarity with the organization in question. Next, I discuss how an individual's motivation influences the effectiveness of different EEBA's via three-way match in cognitive processing.

Three-Way Match in Cognitive Processing

Job seekers who are familiar with an organization are likely to be motivated to carefully process EEBA's containing large amounts of detailed information (Cable & Turban, 2001; Collins & Han, 2004). This suggests high-information recruitment practices, by eliciting central processing, are more likely to be effective for these individuals, (Collins & Kanar, 2014). In the typology, there are two high-information EEBA's, which differ with respect to the attribute content: *High Information-Instrumental* and *High Information Symbolic*. This difference in attribute content is significant: studies suggest that individuals with higher familiarity prefer to evaluate the

organization using instrumental attributes (Brucks, 1985; Sujan, 1985), and therefore this functional congruity effect will be greater for these job seekers. Thus, when exposed to a *High Information-Instrumental EEBA* from an organization with greater familiarity, job seekers would have made available high amounts of cognitive resources to process centrally the message being conveyed. This is important because research predicts that any message will positively influence attitudes and behaviors when the cognitive resources available to process information matches the cognitive resources required to process both information amount and content (Coulter & Punj, 2004; Keller & Block, 1997). Thus, this situation represents an ideal three-way match of cognitive processing, as overall central processing is being facilitated in terms of information amount, attribute content, and motivation. This suggests that this type of EEBA will be effective for organizations with high familiarity.

Proposition 1: Organizational familiarity will moderate the association between High Information-Instrumental EEBA and Job Pursuit Intentions such that the positive association will be greater when organizational familiarity is high.

Conversely, in cases of organizations with high familiarity, a mismatch in cognitive processing would arise when motivated job seekers are exposed to *High Information-Symbolic EEBA*s. After exposure, job seekers will begin to process centrally by engaging in deeper assessment of the large amounts of information being conveyed. However, these high-information messages contain symbolic attributes, which are to be processed peripherally. Due to high familiarity, motivated individuals would have allocated greater amounts of cognitive resources to centrally process the message, but since these messages contain symbolic attributes, subsequent peripheral processing will in effect require fewer cognitive resources than originally allocated (Coulter, 2005). Research suggests that message recipients will use the excess cognitive resources available to generate counterarguments or idiosyncratic, issue-irrelevant thoughts (Keller & Block, 1997). Furthermore, subsequent peripheral processing of symbolic information should result in attitude changes that are temporary and not likely to be predictive of behavior (Lievens & Harris, 2003; Meyers-Levy & Malaviya, 1999). Thus, for organizations with high familiarity, this type of EEBA may not be as effective as *High Information-Instrumental EEBA*. This leads to the following proposition:

Proposition 2: High Information-Instrumental EEBA will result in greater Job Pursuit Intentions among job seekers than High Information-Symbolic EEBA, when organizational familiarity is high.

In the case of organizations that are less prominent and visible, low-information recruitment practices will be effective as these messages will assist in increasing the level of familiarity among job seekers via peripheral processing. This is essential because unless individuals in the labor market are familiar with an organization, they will not be motivated to include it in their consideration set as a potential employer (Cable & Turban, 2001; Collins, 2007). Studies suggest that organizations with low familiarity should not use high-information recruitment practices because job seekers lacking initial familiarity and interest in the organization as an employer will not be motivated to process the detailed information in those messages (Collins & Han, 2004; Collins & Kanar, 2014). Additionally, job seekers with low organizational familiarity would prefer to evaluate messages using symbolic attributes and under these conditions the effects of

self-congruity should be more pronounced and determinative of attitude change (Coulter & Punj, 2004; Johar & Sirgy, 1991; Sop & Kozak, 2019).

Building on these theoretical perspectives, I argue that if the potential employee is not familiar with an organization, when exposed to *Low Information-Symbolic EEBA*s, s/he will allocate fewer cognitive resources to the marketing message and thus will process the message peripherally. The underlying low amount of information and symbolic attributes in the message will also be processed peripherally (Johar & Sirgy, 1991), and this represents an ideal situation where three-way matched cognitive processing of message is taking place in terms of motivation, information amount and content. This three-way match will enhance the persuasive effect (Anand & Sternthal, 1990; Shiv, Edell & Payne, 1997) of *Low Information-Symbolic EEBA*. This leads to the following proposition:

Proposition 3: Organizational familiarity will moderate the association between Low Information-Symbolic EEBA and Job Pursuit Intentions such that the positive association will be greater when organizational familiarity is low.

Finally, when organizational familiarity is low, using *Low Information-Instrumental EEBA*s will lead to a mismatch in cognitive resources required and cognitive resources allocated for message processing. To elaborate, after exposure to this EEBA, job seekers would start to process the message peripherally as there is not enough detailed information to elicit central processing. Given the organization's low familiarity, these job seekers would have made fewer cognitive resources available to process the message and would thus tend to process peripherally. However, these activities contain instrumental information which requires central processing (Sirgy, Grewal & Mangleburg, 2000). Meyers-Levy & Malaviya (1999) argue that when cognitive resources allocated is less than the resources required to process the message, persuasion effect of the message would be diminished through superficial message processing. Additionally, job seekers may become disinterested and frustrated, generating negative thoughts and affects (Dens & Pelsmacker, 2010). This leads the prediction that for organizations with low organizational familiarity, this type of EEBA may not be as effective as *Low Information-Symbolic EEBA*.

Proposition 4: Low Information-Symbolic EEBA will result in greater Job Pursuit Intentions among job seekers than Low Information-Instrumental EEBA, when organizational familiarity is low.

EFFECTIVENESS OF EEBA BASED ON OTHER (INDUSTRY, ORGANIZATION, AND INDIVIDUAL) CHARACTERISTICS

While it is possible to use the same employer branding strategy for all employees, employer branding is not a 'one-size fits all' solution – in fact, as discussed in the previous section, effectiveness of EEBA may very well depend on how familiar jobseekers are with organizations. Other factors may also influence the effectiveness of EEBA, and thus a brief discussion is warranted here that examines the various industry, organization and individual differences that can influence the success of EEBA. First, I focus on the industry-level since industries differ in terms of opportunities, attributes, and adversities.

Industry Characteristics

No two industry are the same and possess crucial differences that may render the EEBAs applicability in one industry meaningless in another. Recent research findings suggest that industries should identify the employer attributes that potential employees perceive to be attractive specific to the industry, and consequently design employer branding activities that are congruent with such perceptions. For instance, in healthcare, there exists high demand for qualified and trained workers, but this industry is also characterized by long work hours, health risks and high potential for employee burnouts. These factors together often drive the competition for skilled workers. In a recent paper, Koch-Rogge & Westerman (2021) found that for experienced healthcare professionals, symbolic attributes were more attractive than instrumental attributes, particularly those related to social aspects such as colleague quality and team/leadership culture. This suggests in this industry, employer branding messages should primarily contain symbolic information related to these aspects. The paper also noted the importance of increased organizational awareness and reputation among stakeholders. Based on the typology presented earlier, it can be surmised that in the healthcare industry, organizations should first audit how familiar they are among jobseekers, and based on that, determine whether to use High Information or Low Information EEBAs.

Another example of an industry that is service oriented is hospitality, but this industry is often negatively identified with characteristics such as labor shortage and high turnover due to employee dissatisfaction and low wages. Gehrels & de Looji (2011) surveyed hospitality decision makers and found instrumental attributes such as high wages and job security to be significant factors influencing employer attractiveness. Likewise, Shwaiger, Zehrer & Spiess (2022) found the instrumental attribute pay to be a significant factor influencing perceived hospitality industry attractiveness. Taken together, these findings indicate that organizations in the hospitality industry must differentiate themselves in terms of how much pay they offer jobseekers. In congruence with my typology, if an organization in the hospitality industry is well known among workers, then it may be prudent to use High Information-Instrumental EEBAs. In contrast, if the organization has low familiarity and awareness among stakeholders, then Low Information EEBAs should be used.

Organization Characteristics

Very little research has examined how organization-level characteristics may influence the effectiveness of an organization's EEBAs. One of the relevant organization characteristics already mentioned in this paper is organizational familiarity. Three other characteristics are now discussed: corporate reputation, age and size of the organization. Propositions 1, 2 and 3 are applicable in these cases as well, since familiarity as a construct is distinct from but related to reputation, age, and size. Corporate reputation, defined as "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to its key constituents when compared to other leading rivals" (Fombrun, 1996: 72), is correlated with organizational familiarity since organizations with favorable reputations are likely to be prominent and hence receive greater public recognition (Rindova et al., 2005). Due to this positive correlation between these two constructs, it can be postulated that organizations with

high corporate reputation should use High Information-Instrumental EEBAs, while Low Information-Symbolic EEBAs should be used by organizations with comparatively lower reputation.

Likewise, it can be argued that an organization's familiarity varies with the age of the organization. A start-up organization is likely to be less known and prominent than an organization that has been doing business for some time. Clearly, a new venture will have low familiarity among stakeholders due to limited resources allocated towards advertising, low to no angel investment funds, unfamiliar product and/or services, etc. (Brooks, Heffner & Henderson, 2014). However, with the passage of time, the organization may gradually gain recognition and familiarity as it expands and matures, accompanied by increase in revenues to carry out advertising and promotional activities on a larger scale. Thus, following the logic established earlier, Low-Information Symbolic EEBA is appropriate for newer organizations with low visibility and awareness among stakeholders, while mature, older organizations should employ High Information-Instrumental EEBAs.

The same arguments stand for organization size. Newer organizations, due to limited resources and capabilities, are limited in size and scope, thus having lower familiarity among stakeholders. In comparison, older, established organizations are likely to be larger in terms of their operations, consumer, and resource base, which would allow them to spend significant capital on promotional activities, experiment with newer products and/or services that consumers will value, etc. resulting in further expansion of the customer base. All these again suggest that smaller organizations should use Low Information-Symbolic EEBAs, while High Information-Instrumental EEBAs be used by larger organizations.

Individual Characteristics

Admittedly, the best possible way to make EEBAs effective would be to develop a core employer value proposition, and then customize the message to address individual job seeker's needs and preferences. However, research to-date has not explicitly focused on employer branding at this specific individual-level of analysis. From a practical standpoint, it is likely to become quite complex and prohibitively expensive for an organization to customize its employer branding message by taking into consideration individual job seeker's interests. For these reasons, EEBAs are often designed to target a broad range of employees or worker groups. In this section I will elaborate on some examples of individual-level characteristics in terms of groups of individuals sharing certain common attributes.

A large proportion of first-time job seekers are Gen Zs and millennials, many of whom are recent college graduates, and studies have indicated these groups are greatly concerned with meaning in life and value work-life balance, ethical behavior, and diversity, equity, and inclusion (DEI) (Sánchez-Hernández et al., 2019; Tirta & Enrika, 2020). Therefore, when attracting potential applicants from these groups, organizations should include symbolic statements in their EEBAs that highlight commitment to promotion of work-life balance such as flexible work schedules, and DEI initiatives. The symbolic information should also promote an organization's culture of accountability and respect, and the impact the organization has on society.

Another important group that must be mentioned are female job seekers. As of September 2022, women labor force participation was 58.4% (Roy, 2022). While women constitute a major portion of the labor force in the US, factor such as gender stereotypes, lack of work-life balance and mentorship opportunities, unequal pay, etc. hinder career progression (Rosette et al., 2016). These factors lead to dissatisfaction and de-motivation, and ultimately positively impacts turnover intentions among women. Organizations should develop EEBA's that appeal to women by including symbolizing information regarding how DEI is valued. The EEBA's can also showcase the stories and success of women leaders currently employed, and explicitly mention commitment to creating a culture of empowerment, respect, and inclusion. These EEBA's ultimately should help attract more female candidates, who are looking for employers that match their values, needs, and goals.

While this section illustrates several examples of industry, organization and individual-level characteristics that influence the success of an organization's EEBA initiatives, there are many other industry, organization and individual-level factors organizations must consider when attracting potential candidates. Future organizational research should explicitly identify these characteristics and build theory around them with testable hypotheses, and organizations can use the findings to holistically consider factors at all levels of analysis when formulating employer branding strategies.

CONCLUSION

Recent research on recruitment has highlighted the importance of attracting human resources, asserting that organizations must use sound recruitment communication to win the "war for talent" (Chapman et al., 2005; Kwon & Jang, 2022). To attract employees, organizations must design effective employer branding strategies. This is an important issue because the success of different EEBA's may very well depend on the match and mismatch in cognitive processing of both information amount and attribute content in recruitment messages. Prior research investigated applicant attraction by developing different research streams that considered separately the amount of information and instrumental/symbolic attribute content in recruitment messages. Each research stream identified benefits and limitations related to attribute content and information amount; however, in this paper I proposed that a more complete understanding of the effectiveness of recruitment messages can be attained by considering the joint effects of both information amount and attribute content on employee attraction to organizations. This distinction is particularly important and relevant inasmuch as different levels of information and attribute content will differentially require either central or peripheral cognitive processing.

I therefore shifted attention to the cognitive processing of both information amount and attribute content in external employer branding activities and integrated these concepts to develop a typology of EEBA's. This is a novel contribution to recruitment literature because no other study to date has addressed the joint effects of both information amount and attribute content on applicant's job pursuit intentions. However, I theorized that not all EEBA's identified in the typology will be equally effective in this regard. Drawing on the ELM, I predicted that EEBA's that facilitate match in cognitive processing pathways should be able to significantly influence job pursuit behavior. I further argued that the effectiveness of these EEBA's may depend on job seeker's motivation to process the information – and as such, I discussed job seekers' familiarity

with the organization. Four propositions are put forth in this paper, but future research should develop testable hypotheses to empirically test these ideas. Relatedly, factors such as personal relevance, need for cognition, etc. may also influence motivation (Petty et al., 1987), which should be explored in future work. I also include a brief overview of various industry, organization, and individual-level characteristics that may influence the suitability of using the EEBA in my typology. I provided examples of some current research that has explored attribute content in recruitment messages in the context of healthcare and hospitality industries. Future research should look at how the EEBA developed here are applicable in other industries. For instance, in higher education, there exists variation in the type of information provided in recruitment messages for faculty and administrative positions. Research should identify the attributes that are valued by job seekers in these different jobs. Furthermore, job seekers may be more familiar with the industry in general than individual institutions of higher education, and this level of awareness may moderate the effectiveness of EEBA at an industry level of analysis – future research should explore this as well.

In my EEBA typology, I dichotomize the information amount dimension as either being high or low. Future research could expand this typology further by introducing an additional type containing intermediate amount of information, and how such information is processed cognitively. Research can also be carried out on how EEBA use of organizations evolve over time. For instance, the EEBA of new firms may be different from the ones used by established firms, because of variations in their level of awareness among job seekers. Research could explore whether the use of EEBA evolve over time as organizations grow and mature. On a similar note, studies could investigate changes in EEBA content due to corporate reputation damage. This can be seen as a form of impression management. For example, when facing a negative event that has potential detrimental ramifications for an organization, should the message content in the EEBA be altered to highlight more of the organization's positive attributes that are valued by job seekers? Would these changes be believable and would job seekers, having realized this manipulation had taken place, become more averse in their behavior and attitude towards the organization? These questions need to be addressed by taking into consideration changes in the perceived corporate reputation due to negative events.

Additionally, corporate reputation has been identified in literature as being a multi-dimensional construct (Fombrun, Gardberg & Sever, 2000). For instance, firm size, media visibility and financial performance were found to be antecedents to reputation. Future research could study other dimensions of this corporate reputation construct and how each of these dimensions moderate the effectiveness of different EEBA. Finally, research can explore whether after being exposed to EEBA, the nature of cognitive processing (Petty et al., 1987) predominately generate favorable versus unfavorable thoughts, and whether the attitude and belief change are relatively stable and enduring.

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DAWN OR DOOM: TECHNOLOGY, TECHNOLOGIST, AND THE FUTURE OF THE ACCOUNTING PROFESSION

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ABSTRACT

This research looks at the possibility of technology replacing accountants and the possibility technologists will replace accountants. The current era of accounting is dominated by mobile devices, big data, cloud technologies, and improved accounting systems. The problem is accounting firms have been slow to fully use these new technologies. To stay competitive, firms need to employ these technologies. Researchers interviewed high profile accounting technology leaders from professional organizations in the accounting industry including managers, partners at accounting firms, and data scientists. Researchers used white papers, peer-reviewed materials, and personal interviews to collect data. The findings provide an overwhelming realization that technology can aid accounting. Researcher's found technologists cannot replace the profession's most valued skills.

Keywords: technology, technologists, accounting, profession, strategy

INTRODUCTION

The development and use of new technologies has created, destroyed, and changed countless industries. Using business analysis grew with increasing Excel capabilities, and because of outlier increases in the data, new techniques and programs arose to once again fill voids in demand. Like all others, the accounting profession is not immune to changes brought by developing better, more automated systems. Similarly, the skills and knowledge needed by modern accountants are changing while companies employ these new technologies (Johnson & Steed, 2018; Stanciu & Gheorghe, 2017). Now more than ever, accountants, both budding and veteran, must remain aware of the technological changes to preserve their relevance, efficiency, and competitiveness in the industry (Pacurari & Nechita, 2013).

The accounting software is the most widely recognizable technologies in the accounting profession. This software can come in multiple forms of varying complexity. On the less complex end of the spectrum, accounting software can automate the processes of bookkeeping. Software use aids recording financial transactions, performing arithmetic operations, and producing reports (Tóth, 2012). Larger firms incorporate comprehensive Enterprise Resource Planning (ERP) systems into operations (Momoh, et al., 2010). Sternad, Gradisar, and Bobek

(2011) defines a “integrated, all-encompassing, complex mega packages designed to support key functional areas of organizations.” Thus, ERP systems support the countless functions of businesses in many different industries. Further, within these broad systems are "Accounting Information Systems," sub-systems used to aid the accounting processes (Tóth, 2012).

Another advance in business follows processes performed via the Cloud. Cloud computing is a method of running programs, storing information, and performing tasks on a computer without needing to use local memory such as a hard drive, flash or install programs on a computer (Prantosh, et al., 2013). As a result, procedures are performed over the Internet. This allows companies to store information and maintain and upgrade systems through an outside firm. This is important for smaller firms, which historically do not have the capacity to afford a large capital investment in technologies. Firms can now use superior technologies to achieve enhanced efficiencies, improved security, and cost savings without the need for excessive investment (Cleary & Quinn, 2016). Cloud computing can serve many processes in financial management and accounting. Cleary and Quinn (2016), found small and medium-sized enterprises (SMEs) increase performance through cloud computing. Therefore, agreeing with common belief, their research suggests the proper use of cloud technology has an overall benefit for SMEs. According to research by Drew (2015), CPA firms have been slow to use cloud technologies in their practice.

Third, using mobile devices has been steadily becoming more prevalent in the accounting profession. Mobile accounting applications allow employees to input information and produce reports from their device (Tribunella & Tribunella, 2016). Other mobile applications have more specific tasks. For example, Deloitte uses a mobile application called Icount to collect and consolidate inventory count results (Raphae, 2017). According to research by Stanciu and Gheorghe (2017), using mobile devices in the accounting profession offers a series of benefits including portability, connectivity, and flexibility. However, these devices also come with certain disadvantages. The downsides include security and unauthorized or unproductive use of devices for personal activities. Despite the disadvantages, using mobile devices in the accounting profession continues to rise because of the possible benefits (Stanciu & Gheorghe, 2017).

Finally, big data is recognized as one technological idea changing the accounting profession. In a basic sense, "big data" refers to the collection, manipulation, and analysis of large datasets to reveal certain patterns, trends, or other useful information (Hajirahimova & Aliyeva, 2017). The increased capacities of computer systems have allowed for analyses of increasingly larger datasets. Because of the useful information produced from big data, analysis techniques have been adopted by many businesses in different industries. According to a review of the literature by Gepp, Linnenluecke, Terrence, and Smith (2018), firms in the auditing profession have been slow to employ big data analysis techniques. This is strange since the research continues to point out many opportunities for its use in financial distress modeling, financial fraud modeling, stock market prediction, and quantitative modeling (Gepp, Linnenluecke, Terrence, & Smith, 2018). Bloomberg is an example of this change. Bloomberg is a large financial firm specializing in financial data for stocks, bonds, currencies, fixed income securities, and Exchange-Traded Funds

(Bloomberg, 2019). It is natural to assume the firm has a large need for finance and accounting students. However, at the Industrial Roundtable college career fair hosted by Purdue University, researchers viewed that Bloomberg wants to recruit Information Technology majors instead. The campus recruiter's reaction was "we can teach an IT major finance, but we cannot teach finance and accounting majors programming."

From this, one can see business, in general, is undergoing a transition to a new technological era. Specifically, this era is governed by the implementation and use of mobile devices, big data, cloud technologies, and improved accounting systems. Although these advancements provide a multitude of potential benefits for accounting firms, research has shown these firms have been slow to embrace these new technologies. This is especially true for using big data and cloud (Drew, 2016; Gepp et al., 2018; Newquist, 2014). These firms will eventually need to employ these technologies to stay competitive in their field. This, however, brings about an important concern for many accountants. As technology continues to advance, automation becomes more prominent. As previously stated, accounting information systems and ERP systems have the capacity to automate many of the accounting processes, theoretically removing the need for accountants in some aspects (Tóth, 2012). This leaves many to wonder if technologists could replace accountants. Also, research has found the skills demanded by accounting employers are changing with technology advancements (Stanciu & Gheorghe, 2017). This leads theorists to wonder what new skills would be needed to remain competitive in the workforce. The following questions drive this research:

- *Do technologists have the potential to replace accountants? and*
- *Is the accounting profession positioned to withstand an ever-changing environment of new technology and the threats they pose?*

The balance of this work is organized into the following four sections. First, a literature review looking at prior literature that informs this study. The next section includes methodology, including both the research question and experiment design. The third section includes the research findings. Finally, the research ends with conclusions, including limitations, implications, and future research.

LITERATURE REVIEW

To begin piecing together an answer to the research question, one must begin with an understanding of the technological environment surrounding the present-day accounting profession. As previously stated, four main technological advancements within this analysis: ERPs (containing accounting information systems), mobile technologies, cloud technologies, and big data techniques. A review of relevant literature finds each of these offer important benefits. For example, mobile device use offers portability, connectivity, and flexibility (Stanciu & Gheorghe, 2017). Prior research, however, has also shown that accounting firms have been slow to use cloud technologies and big data techniques (Drew, 2015; Gepp et al., 2018). Despite this,

these advancements were recognized as the future of the accounting profession (Drew, 2016; Newquist, 2014).

This brought up an important question regarding whether technology can replace accountants. It is important to see the possibilities for automation in the accounting profession. According to research by Galarza (2017), mundane tasks in the accounting profession, such as number crunching and process-driven auditing, are the most susceptible to automation. This research continues to state that Artificial Intelligence (AI), which follows Machine Learning, might eventually have the potential to automate more critical activities (Galarza, 2017). Despite this potential, the literature suggests there are skills technology cannot replace. For example, the auditing profession requires practitioners to render judgment on various subjects. Although technology may automate the supporting activities of the judgment process, it cannot replace rendering judgment (Lombardi, Bloch, & Vasarhelyi, 2014). In another study, Brands and Smith (2016) recognize automation is disrupting the traditional managerial accounting reports, but not the decision making typically done by humans. Their research continues to state the “human touch” cannot be replaced. Managerial accountants, unlike machines, bring about a dynamic familiarity to the context and history of the businesses they work for (Brands & Smith, 2016).

Previous literature consistently agrees that many processes can replace humans, a decision-making capacity is necessary in the accounting profession. This agrees with research by Boylan, Philipp, and Latini (2018), which concluded technology could replace many of the tedious, mundane activities related to accounting. This research also found it could not replace the higher-level decision making and contextual understanding unique to the human mind. Thus, the technology could not, in a sense, replace accountants (Boylan et al., 2018). New technology is leading to a change in the skills demanded by employers. Research by de Villiers (2010) shows the future of the accounting profession will need “soft skills.” These include non-accounting skills such as interpersonal skills and self-management. Also, professionals will need to uphold a growth mindset, constantly learning and developing themselves to keep up with the ever-changing profession (de Villiers, 2010). Stanciu and Bran (2015) note some specific generic skills, which include:

- *learning and thinking skills; the ability to be a reflective learner*
- *interpersonal skills*
- *creativity skills*
- *research and inquiry skills*
- *work habits (adapting to the workplace environment and work requirements)*
- *ethical leadership*
- *IT skills (because of the large use of information technology in all domains).*

Therefore, the literature suggests technology will lead to less of a need for technical and data entry accounting skills. In return, employers will want their employees to have more analytical and "soft skills," which will make them far more adaptable in the changing business atmosphere (DeloitteVoice, 2017).

The trend toward a drop in data entry skills allows the profession to focus on providing a high-level of service on more analytical skills. Also, "soft skills" are becoming more important. This could potentially suggest that although technology cannot replace accountants, perhaps technologists can. Immediately, a few factors that must be considered before analyzing this possibility. Certain tasks Information Technology (IT) professionals cannot do. For example, only a Certified Public Accountant (CPA) can perform the external audits required for public firms (AICPA, 2019). But, research by Coyne, Coyne, and Walker (2017) identifies accounting professionals' lack of IT knowledge. Thus, these firms usually need to hire IT professionals to perform even the most mundane technological tasks. IT professionals work side-by-side with accountants. However, the research continues to state if accountants do not learn the IT skills they need, IT professionals may begin to learn accounting skills and eventually replace accountants (Coyne, et al., 2017). This threat has also caused many accountants to strive to learn IT skills and earn certifications that will allow them to qualify as forensic accountants and IT auditors (Kearns, 2014). Therefore, it seems from the literature the threat of replacement from IT professionals is significant.

Finally, although it was concluded technology could not replace accountants, one must know about the threat of partial automation. In this situation, the technology could eliminate some roles which would otherwise be completed by humans. For other roles, however, technology would not have the capacity to offer a substitute for the "human touch," as explained in research by Brands and Smith (2016). As shown by Boylan et al. (2018), companies will often use technological options to obtain cost benefits. This is a result of a worthwhile cost-benefit in favor of software costs over long-term labor costs. Similarly, Schoenfeld, Segal, and Borgia (2017) explain in their research using machinery over accountants can have other, accuracy-related benefits. Thus, this situation becomes a balance of costs versus benefits. Here, the rational company will replace a human with a machine if benefits outweigh costs.

The main benefit of technology is cost savings. These can be both tangible and intangible. For example, they may include monetary costs, but they can also include concepts such as range of ability, flexibility, efficiency, and many other reasons. It is impossible to replace a partner's intellectual capacities with a machine. Replacing a bookkeeper is easier to achieve. In fact, one qualitative study showed cloud technology could eventually perform bookkeeping and accounting without the need for human interaction (Howell, 2015). This means companies can choose between technology and humans in certain situations. To make this decision, a company would have to consider the value and responsibility of their human capital (Davenport, 2016).

The typical framework for an accounting firm. At the low-end several "entry-level" accountants are hired at the "staff accountant" or "audit associate" level. As time progresses, successful employees will move up through an accounting organization via a normal progression: "senior accountant," then "manager," to "senior manager," then finally the "partner" level at the high-end. As this career progression continues, the number of professionals dwindles at each rung. The shrinkage is significant as only about 3-5% of "staff accountants" will achieve "partner"

status (Armitage, 1992; Wilson & Remer, 2009). This is because few professionals can survive both the demands of the firm and the ability to achieve professional certifications to become a partner. Thus, the overall structure of the firm represents a "pyramid" shape (Malancon, 2016).

This structure is the opposite of the Inverted Triangle of Responsibility in this format, as an accountant moves up in an accounting firm, the responsibility also increases. Young professionals entering the profession normally perform basic accounting and clerical roles. Conversely, partners have a significantly larger responsibility level, which includes dealing with clients and researching changes in laws, tax codes, and accounting principles. Only a CPA can issue an opinion regarding financial statement accuracy. Added tasks include administrative decisions (Nihill, 2018).

Educating accountants is another challenge. In general, instructors are still teaching accounting the same way they were thirty years ago. Several issues cause this. These include lack of resources, aging faculty, cost of "add on" materials to supplement textbooks, and lack of knowledge on business needs. An added concern is that schools do not see a need to modernize their curriculum (Schoenfeld, et al., 2017).

Overall, the literature shows changes brought about by technology are vast. Thus, accountants must remain aware of technological trends in the business realm and the trends affecting their profession. Otherwise, they may find themselves becoming obsolete, susceptible to replacement by IT professionals or the technology itself. Therefore, there exists great pertinence in analyzing the technological trends and interpreting this information to discover the substitutability threat to accountants.

METHODOLOGY

This study stems from the need to explore and explain trends in data analytics and how they impact the accounting profession. Technology and the possibility of it causing radical industry change and job loss has always been a concern (Morris, 2017). Recent changes to the dynamics of the accounting profession have heightened this awareness. Also, data science has become a formidable competitor for decision making (Mickhail, 2017). This study takes the present form of the accounting firm and applies environmental influences to predict the firm of the future. Specifically, this research looks at the possibility of technologists replacing accountants. The research includes combining the top concerns of CEOs with a review of analytical skills. The research also looks at how accounting and data science professions are organized and positioned for the future.

Participants

This was a qualitative analysis that interviewed high profile leaders in the accounting industry. First, the accounting professional representing the AICPA was Barry Melancon. Mr. Melancon serves as the AICPA's President. Additionally, researchers interviewed partners in accounting

firms and leaders in the data science industry. Researchers engaged participants multiple times during this study. When possible, these interview results were verified by second party sources such as “white papers” and peer-reviewed articles.

Researchers compiled all data from those interviewed and created many figures that were later confirmed for accuracy with the participant. This often included the participants writing the figure description and reviewing researcher work to ensure accuracy.

Table 1

Survey Participants

Firm	Participants	Firm Location
Deloitte	5	New York City, Denver (2), Austin, Portland
EY	5	San Diego, Seattle, Atlanta, Cleveland, Dallas
PwC	5	New York City, Indianapolis, Chicago, Philadelphia, Miami
KPMG	5	Stamford, Philadelphia, New York City, Minneapolis, Denver
Regional Firms	10	Fort Wayne, Philadelphia, Atlanta (2), St. Louis, Pittsburg, Houston, Columbus, Little Rock, Dallas
Total	30	

Table 1 list the firms and their location of the participants as well as the number of people participating. The total number of participants was 30. One can see there were 5 participants from each of the Big 4 firms while there were 10 participants form regional firms. Researchers purposely inquired from a larger population or regional firms to see if there would be a difference in the findings.

Materials

The analytical materials using in the study include various peer-reviewed, accounting industry, university, and data science materials. The AICPA provided many materials on the accounting profession and the anticipated future. Also, a survey on the top concerns of the world's CEOs was documented. Researchers also noted where data science degree programs reside in various universities. This was completed by reviewing several university websites. On completion of this information gathering, all materials were organized in a logical format to communicate findings and develop conclusions.

Table 2

Survey Questions asked of Participants

Question
What are technologies your firm is using?
What are technologies your firm is looking to use in the future?
Are there any IT services you need to outsource because of firm lack of knowledge?
What are the technologies you expect from new hires?
What technologies are you looking to hire trainers for?
Can you name technologies you consider vital for competition?

FINDINGS

In the fast-paced environment of business, entrepreneurs continue to need analysis of information. Technology often has a slower pace in analysis due to programming needs and can be inferior to human wisdom. These are listed in Table 3:

Table 3

List of Areas and Expertise where Human Wisdom is Superior to Technology

Areas
Assurance that systems are programmed well and work as intended
When a business owner needs someone to communicate with them including interaction
When new information is needed on demand (that has not been previously programmed)
When data is complex and needs experienced interpretation
When business owners need to feel they have received value for money spent

Table 3 displays the area of expertise where human decision making and knowledge is superior to technology. Organizations can cut budgets by performing services such as bookkeeping and payroll independently or by using products freely available on the open market. While software may be cost-effective, risks still exist. One of these risks is input errors. Though daily transactions may be entered into the system correctly, the possibility of user error exists. This is a result of users being unable to grasp various underlying concepts and procedures of programming accounting software. Unskilled users may not know what correct data looks like (Schiff & Szendi, 2014). Common mistakes include having multiple income and expense accounts, repeat names in vendors and customers, and overstated balances in non-deposited funds. Any error in business information resulting from programming errors could be detrimental

to the business owners. The checks and balances provided by an external accounting firm can mitigate this challenge. It has been found “external accountant use is positively related to sales growth” (Barbera & Hasso, 2013). In this case, technology has started to replace the need for accountants but hasn't erased the need for them completely. Also, when business owners seek value, they often are looking at the soft skills the professional can provide.

The world's CEOs also have concerns about several issues. CEOs will need to develop decision-making skills on various topics. Those topics can be seen in Table 4 below:

Table 4

Top Concerns for the World's CEOs Including Percent Saying the Item is an Issue

Concern	Percent Responding
Over-regulation	79%
Geopolitical uncertainty	74%
Exchange rate volatility	73%
Availability of key skills	72%
Government response to fiscal deficit and debt burden	71%
Increasing tax burden	69%
Social instability	65%
Cyber threats	61%
Shift in consumer spending and behaviors	60%
Lack of trust in business	55%
Climate change and environmental damage	50%

Table 4 above shows the top concerns CEOs have for the future. These include the percentage of CEOs felt an issue was important. The table shows the largest concern is regulation and uncertainty and exchange rate volatility with rates of 79%, 74%, and 73% respectively. Each of these concerns would require significant data to be strategically analyzed. These decisions will need to be made by humans with the aid of technology rather than a technologist with the aid of analytical skills. Technology is not currently advanced enough to make these decisions given the possibility of errors; the negative consequences of those errors could be disastrous to an organization (Melancon, 2018).

Do technologists have the potential to replace accountants?

Accountants are now able to “step away from the drudge of data entry and exercise their advisory talents much more freely” (Baker, 2016). Efficiency benefits everyone. It means lower costs to customers but higher quality of work. Using software has some risks because of data being stored in the clouds. Security over data, reliability and performance issues, vendor lock,

data portability, and dependence/lack of control are just a couple of issues encountered when using cloud-based programs. To lower the chances of having problems, accountants "need to be sure they have the latest product versions and patches and they are being diligent in terms of password" (Drew, 2016).

Even though using cloud-based software has its risks, accountants should keep current to be competitive. Younger clients now expect high-tech relationships and value pricing from their accountants. Those clients are looking for advice, frequent communication, and collaboration, which is discouraged by hourly billing. Accounting professionals who can provide proactive business advice based on real-time client data will be desired (Newquist, 2015). Frequent communication is becoming a key factor in client retention, which is why value pricing is becoming more and more important. "The cloud is simply an enabler to help professionals meet and exceed the expectations of today's client" (Drew, 2015). Using software makes accountants more efficient, which gives them extra time to be of value to their clients.

Competence in cloud-based software allows accounting professionals to continue to improve their high-tech relationships with their customers. Accountants must also learn various technical skills, should they hope to compete with software packages. To be as technically proficient as desired by a client, professionals may have to branch outside the field of accounting to prevent potential obsolescence. The software desired by clients is cheaper than hiring a professional, but a professional with extensive knowledge of this software may have a competitive advantage over the traditional CPA.

There are various categories of technology needed in accounting. These include spreadsheets skills; technology and analytics skills; and research and data science skills. Some spreadsheet skills accountants need include "if statements," "Vlookup," "pivot tables," "advanced analytics in Excel," and creating "macros." These skills are commonly used by professionals in human resources, sales & marketing, finance, and accounting. Technology and analytics skills include SQL, VBA, data mining, Internet of Things (IoT), and the R programming language (Stodder, 2018). Professionals with these skillsets include technology consultants, business intelligence, business analytics, and marketing analytics. Research and data science skills include: matrix algebra, gradient descent, abstract math, Machine Learning, Artificial Intelligence, and linear optimization, to name a few. Professionals with these skills include applied research and internal data science centers of excellence use these skills (Hunter, 2018; Stodder, 2018).

Is the accounting profession positioned to withstand an ever-changing environment of new technology and the threats they pose?

The accounting profession has many strategic tools at its disposal. First, is creating data science Centers of Excellence (COE). These are organizations dedicated to using data-driven information in innovative and unique ways. Often, this information is complementary to audit services and has a large revenue-producing ability because of client need for a competitive advantage. Table 5

shows a sample of various Data Science COEs and the organization they are affiliated with (Kobielus, 2012).

Table 5

Business Community's Data Science Center of Excellence

Organization	Data Science COE
McKinsey	New Ventures
Boston Consulting Group	Gamma
KPMG	Data Analytics Lighthouse
EY	PI Advanced Analytics
PwC	Data & Information Analytics
Deloitte	Advanced Analytics Enablement
ZS Associates	Advanced Data Science Group (ADS)
Saama	Various
Oliver Wyman	Oliver Wyman Labs

Table 5 shows several organizations and their Data Science COE offshoot. All four of the Big 4 accounting firms are represented. These include KPMG, EY, PwC, and Deloitte. Five other reputable organizations are represented. This includes McKinsey, Boston Consulting Group, ZS Associates, Saama, and Oliver Wyman. One of these organizations, Saama, is a leading pure-play data and analytics solutions and services company. Their COE, Various, was designed specifically to enable business units and IT groups to leverage big data and data science to build valuable action insights quickly and expertly. This collaboration makes it possible to deliver in a three-month time-frame results for business solutions. These solutions include churn analytics, patient engagement analytics, fraud analytics, service analytics, clinical operations analytics, and customer buying pattern analytics (Lombardi, et al., 2014). Skills are inverted in each profession, and the skills are much more technical in nature give data analysts a competitive advantage that accounting professionals do not have. Should this trend of divided skillsets continue, accountants may have a hard time staying relevant due to both software and the emerging field of data analytics (Cegielski & Jones-Farmer, 2016; Hunter, 2018).

Little consistency in the curriculum of IT degree programs among universities exists. Taking a quick look at the various degree programs and the typical departments administering those degrees finds there is many areas offering degrees related to business decision-making technologies. Table 7 shows various university programs.

Table 6

List of Various Names Universities have used to Define Various Technology Areas

Program	Typical Department
Informatics	Technology
Business Analytics	Business
Applied Sciences	Computers
Information Technology	Computers or Business
Information Systems	Computers or Business
Computer Science	Technology
Electrical and Computer Engineering	Engineering
Human-Computer Interaction	Psychology
Interactive Media	Communications

From Table 6, it can be seen the various programs and departments where technology degrees are issued. These programs range from Informatics to Interactive Media and are embraced by at least six different areas within universities. These areas include technology, business, computers, engineering, psychology, and communications. One difficulty with this discipline is the lack of focus in one area or advocacy group. In fact, no widely accepted certification such as the CPA licensure exists. The most recognizable certification is probably the Microsoft Certification offered by the Microsoft Corporation.

Table 7

List of Red Flags for Analytics Programs

Red Flags for Analytics Programs
The executive team lacks a clear vision for its advanced-analytics programs
No one has determined the value the first use cases can deliver in the first year
There's no analytics strategy beyond a few use cases
Analytics roles - present and future - are poorly defined
The organization lacks analytics translators
Analytics capabilities ineffective analytics organization structure
Analytics operations are isolated
Data-cleansing efforts are done in masse
Analytics platforms aren't built to purpose
Nobody knows the quantitative impact that analytics is providing
No one is hyper-focused on ethical, social, and regulatory implications of analytics initiatives

Table 7 identifies ten red flags of analytics programs. In general, the research found that analytics programs face barriers because they lack a vision. As a result, there is an inability to

define value and quantify impact. These issues are further diminished as analytics initiatives often lack a focus on ethical, social, and regulatory implications (Fleming, et al., 2018).

For any profession to withstand possible competition, it must be trustworthy and generate satisfaction (Groșanu & Răchișan, 2010). Table 8 below shows how the accounting profession, as defined by both CPAs and non-CPA accountants, fare compared to other professions.

Table 8

Trust of Professionals in Various Business Decision-Making Positions

Profession	Percent
Certified Public Accountants (CPA)	93%
Physicians	90%
Commercial Bankers	80%
Attorneys	72%
Business Executives	62%
Marketers	41%

From Table 8, one can see the comparison of professions based on trust. Certified Public Accountants were the highest rated group while Marketers were the lowest with a trust of 93% and 41% respectively. Though physicians have traditionally been the highest rated profession, the COVID-19 pandemic impacted their ratings with a lowered trust rating of 90%. Commercial Bankers, and Business Executives had trust levels of 80%, 72%, and 62% respectively (Daily Briefing, 2023). As can be seen, data analytics professionals were unable to be measured because of the lack of ability to define the profession.

Accountants also fared well on satisfaction. Both business decision-makers and investors responded with high marks on satisfaction. Table 10 below shows the results.

Table 9

Overall Satisfaction with CPA Performance

Type of Decision Maker and CPA	Satisfaction Percent
Business Decision Maker - Internal CPAs	93%
Business Decision Maker – External CPAs	90%
Investors – overall CPA profession	97%

Table 9 shows the overall satisfaction with the CPA profession. Both business decision-makers and investors had satisfaction levels at or above 90%. Investors had the highest marks at 97%

while external CPAs had the lowest scores among business decision makers with a 90% satisfaction level (AICPA, 2019).

Table 10

Initiatives by the AICPA to Expand the Base

Initiative	Style of Support
Center for Plain English Accounting	Education
Fair value measurement credentials	Education
Not-for-profit Support	Education
Lighting the Fire (strategies for future learning)	Firm Strategy
Firm in Motion (strategies for firm success)	Firm Strategy
Developing and maintaining a new workforce	Recruitment
Maximizing talent through inclusion	Recruitment
Advancing women	Recruitment

Table 10 shows eight initiatives the AICPA has carried out to strengthen the profession for the future. Three of these initiatives deal with educating users. These include using plain English accounting, credentials for fair value measurement, and support for not-for-profits. Two initiatives involve the AICPA's continued effort to evolve the competency of CPAs by leveraging technology to heighten learning experiences and encouraging firm success through the Firm in Motion program. This program recognizes four factors' firms need to be successful in the future. These reasons include the firm's business model, technology use, client relationship building, and staff development and culture. The last three initiatives involve enhancing the profession, being engaging, and welcoming diversity with a focus on young people, minorities, and women (AICPA Key Initiatives, 2017).

Table 11

Professional Certificates Offered by the AICPA

Certificates offered by the AICPA:
Personal Financial Planning
Forensic Accounting
Not-for-Profit Accounting
XBRL US GAAP
Cybersecurity
COSO Internal Controls
IFRS

Table 11 lists seven professional certificates available through the AICPA. Each of these certificates expands on the eight credentials by offering the ability for professionals to specialize in various areas of systems and analytics. These include personal financial planning, forensic accounting, not-for-profit accounting, the taxonomy of XBRL for US GAAP, cybersecurity, COSO framework, and International Financial Reporting Standards (AICPA Specialty Credentials, 2018).

CONCLUSIONS

The research goal was to see if technologists could replace accountants. The motivation was to examine if accountants are still relevant and vital to an organization or if technologists could fill their role. Skills of technologists have advanced and become commonplace in organizations and professional firms. Today, data scientists lack a professional advocate, a storied history, and an assertive focus on preparing the profession for the future.

Researchers were guided by a major and subsidiary question:

- Do technologists have the potential to replace accountants?
- Is the accounting profession positioned to withstand an ever-changing environment of new technology and the threats they pose?

Do technologists have the potential to replace accountants?

This research found that technologists will not replace accountants. However, the structure of a typical accounting firm is expected to change in the future. The new expected future structure of a typical accounting firm will include both outsourced and data analytics professionals at the lower end of the organizational chart. This means some entry level accountants will no longer be needed. These individuals will not progress up the organizational chart as they will perform routine functions such as data entry and clerical work. Typically, those functions are needed, but they offer little value to the firm when compared to accounting and data analytics. The data analytics area will enhance the firm with new, further analysis, and consulting will improve the organization with additional skill sets. As time progresses, because only a CPA can issue an accounting opinion, outsourcing and data analytics will be limited in their upward mobility. This leaves most upward mobility to the accounting professionals that will need to sign off on the work done by the lower levels.

Although CPA certifications are not necessarily restricted to career accountants, it is unlikely for an IT professional to receive one because of the high-level of accounting technical understanding required. So, an IT professional without certification cannot replace a CPA if the certification is required for the job. Despite this, accounting jobs that do not require certification are more susceptible to replacement and are more difficult to conclude.

When adding this firm structure and the Inverted Triangle of Responsibility one understands that even though outsourcing and data analytics may be done by non-accountants, the decisions at the top cannot be made by those at the lower levels of the accounting firm. One strong example of this is data analytics professionals will never provide an opinion on the financial statements unless they are CPAs. This fact limits, to some degree, their upward mobility (Nihill, 2018).

Technology professions are valuable contributors to the business community. Technologists provide a compliment to the accounting profession by adding value through data mining, data analysis, and performing complex functions where accountants are not normally skilled. Thus, technologists are increasingly important in accounting firms, and they are becoming heavily integrated into the lower levels of the accounting structure. However, they do not have the ability to completely replace the accountant side. The executive levels of an accounting firm must be predominately held by accountants.

Is the accounting profession positioned to withstand an ever-changing environment of new technology and the threats they pose?

The accounting profession has a storied history. Not only is the AICPA a recognized brand, their keystone licensure, the CPA, is widely recognized and respected. This research found the accounting profession is indeed positioned to withstand the ever-changing environment of new technology and their related threats. This is a result of several factors.

First, the AICPA oversees a well-defined profession. The organization has many roles, including the issuance and administration of important licensures and compliance structures. Within the AICPA is the existence of a centralized profession that trains in policies, procedures, and skills needed by the industry. Traditionally, these dictate the design of information systems, GAAP, and professional ethics. From the history of the profession, these concepts have been continually built on and enhanced. Contrary to this, technologists do not have a centralized college degree. The systems used, such as Machine Learning, experience consistent upgrades, but new upgrades often overlay previous versions rather than building on them. Further, the profession lacks the standardized set of rules and ethical standards the accounting profession benefits from.

Second, accountants have an assertive focus on preparing the profession for the future. This is accomplished by expanding skills firms possess through acquiring data analytics firms and the profession adding certification and licensure programs. The profession is also recruiting young professionals and minorities to match the business climate.

Third, the accounting profession has a curriculum, developed by a centralized group, that is focused on developing professionals for the future. The AICPA provides Continuing Professional Education to continue developing and maintaining professionals in the field. Also, the aggressive actions of accounting firms in moving into the data science field provide a competitive positioning to the rise in data analytics firms. These acquisitions enhance the firm by expanding their capabilities beyond the audit practice. Alternatively, the data analytics

profession lacks the focus to expand the profession beyond the technology realm into other aspects of a business. The skillsets flip between data analysts and accountants. Accountants are more proficient in Excel-related skills such as Vlookup and If statements, and data analysts are more proficient in skills such as abstract math and linear optimization. However, they both struggle with processing large quantities of data, which refers to the dip in skills such as R programming language and data mining.

Implications for the Accounting Profession

Information processing is increasing in importance in the future. In the future, there will be friction between those controlling technology and those with the professional competence. Today, accounting “owns” this function. But, for the skillset to remain in accounting the profession must “assume ownership” of data and remain competitive by providing superior outcomes. One implication of this study is understanding the weaknesses of technologists. Several issues exist when considering if technologists can replace accountants. These include being effective with data, the temporary nature of system releases, the inability to offer opinions on financials, and the lack of a centralized educational framework and a formalized oversight body. The research also shows the accounting profession of the past will be significantly different and simple compared to the firm of the future.

Organizations not “digitized” will be at a competitive disadvantage in the future. Accounting firms should seek to enhance their digital and technology positions. This should include encouraging existing employees to engage in technology and acquiring technological skills through acquisition. It also means companies should select new hires that embrace technology. This should include technological competency criteria as part of the hiring process.

Limitations

This study has several limitations. First, there was minimal quantitative data comparing different accounting software. Second, there was a lack of data from accounting firms regarding how they use and work with new technological advancements. Third, the effect of performing Blockchain technology is unknown. Finally, there was no existing survey of business owners asking to see if they preferred to complete daily accounting tasks by software or with advice from professionals.

Future Research

This study has many opportunities for future research and should proceed full steam ahead. One study could focus on the rate of change of technology and the impact of a business environment where consulting revenues outpace traditional accounting fees as major revenue. Thus, it could analyze whether this structure is upended by progressing technology. Another study can research whether data science firms start to buy accounting firms as inroads to future clients. Typically, the audits generated consulting revenue for accounting firms. This possible study could examine whether technology firms acquire accounting firms for the same reason.

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TSA PRECHECK: REDUCING THE COST OF RISK ASSESSMENT

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ABSTRACT

Organizations have a duty to provide a safe working environment. One aspect is screening employees to prevent violent attacks from within the organization. As a result, many organizations are turning to background checks to make this determination. These background checks use databases of publicly available information. Unfortunately, it is difficult to know the quality of these databases and thus these assessments. The gold- standard of criminal background checks is the FBI database. Regrettably, the general public cannot access the FBI database for employment screening unless it is required by law, and authorized by the Attorney General. Interestingly, organizations can access this database indirectly using the TSA's PreCheck airline traveler security screening program. This article proposes that organizations require new hires to obtain a TSA PreCheck— thus indirectly having their background checked through the FBI database. Moreover, it is recommended that organizations routinely check that employees continue to maintain their TSA PreCheck status.

Keywords: background check, workplace safety, employment, risk assessment

INTRODUCTION

We live in stressful times. Huge corporations can justify a significant HR function, and those professionals have skills needed to protect employees from and against the many forms of workplace violence. But what about smaller organizations where payroll, benefits, and recruiting are already stretched to the limit? Since the chances of a violent event seem low, the costs of managing these risks are hard to justify. Background checks are expensive, take time, and there are many laws that limit their use. However, one must remember the potential liability and reputational damage if background checks are either not performed or miss signs that in hindsight are obvious. With 417 mass shootings in 2019, these risks are not trivial (Young & Brewer, 2020). Moreover, work-from-home arrangements since 2020 have weakened previous protections against workplace violence, such as colleagues being in proximity to coworkers and thus able to notice changes that might signal distress. Accordingly, this essay proposes the use of the TSA PreCheck program as a cost-effective way of detecting individuals who should be screened more carefully.

CASE

Consider Tatiana, who arrived at her office near the Long Beach Marriott on August 19th to a world of anxiety. She had never worried about her safety in this upscale area. Indeed, the regional FBI campus is just around the corner. However, today was very different. Last night, thanks to a brave whistleblower and responsive manager, Rodolfo Montoya, a Chef at a nearby hotel where she liked to eat, was arrested and his plans for a mass shooting in the restaurant were foiled (Bellware, 2020).

During the last 10 days, Tatiana has been struggling with her colleagues about her professional firm's readiness to confront workplace violence. There are so many angles, and every solution is expensive. But where would they be or feel if lives were lost and they had ignored the need? On August 31 Tatiana's team headed out to watch the Chargers take on their regional rival the 49'ers. Tatiana was suddenly faced with a new option as she could either enter the stadium through the long line for a careful security search or breeze through with TSA PreCheck. Tatiana thought TSA PreCheck was just for airports, but was quickly able to see how this innovation saved the Chargers the cost of expensive spectator searches and provided a fast and less invasive entry experience for the fans. In no time at all Tatianna, and her team recognized how this and other creative uses of public services could have everyone, including accounting, feeling less anxious as a new—relatively inexpensive—technique for employee background screening now seemed apparent (Ong, 2017).

Risk Management

In recent years the role of the CFO has come to include strategic responsibilities. Moreover, it is now well recognized that the traditional idea of protecting a firm's assets includes a risk-oriented approach to decision-making. Indeed, monitoring the business such that possible shocks are known and suitable actions are taken, or plans in place so that there is resilience to the shock, are fundamental aspects of the CFO's corporate role. Although risks cannot be eliminated, it is nevertheless expected that organizations will be resilient (Markovic, 2019).

Risk management around workplace violence is especially difficult. Any event where people are wounded, injured, or in danger is serious, and the costs are huge. Fortunately, the likelihood of such events is low, so low in fact that it is probably out of mind as it was with Tatiana. Nevertheless, just think of the real consequences to people, the brand, and the organization's future if Rodolfo had not been stopped. Even so, there is an understandable tendency to dismiss the consequences of highly unlikely catastrophic situations (Dobruck & Osier, 2019).

TSA PreCheck provides an opportunity to screen for some of these corporate risks. In this essay we are considering the opportunity Tatiana gained from her observation at the Chargers game. How can the TSA PreCheck be applied to enhance employee screening and ongoing monitoring? The historic intent of a security check has been to filter out hiring choices that could result in financial losses, workplace violence, and other deleterious consequences associated with a

person's record. The security check is done during the hiring process and is problematically of unclear accuracy and rarely repeated at any interval after someone is hired. Indeed, standard security checks go through private agencies that base their work on accessing various potentially incomplete public criminal data-bases. Moreover, once initially completed, employee background checks are rarely repeated for current employees. However, beyond the initial benefits of achieving vetting through high quality government databases associated with using TSA PreCheck for employee background screening, requiring applicants to obtain and maintain TSA PreCheck approval also provides an opportunity to detect changes in employees' criminal histories. Upon reflection one can see how the timing and scope of a standard security check might fall short of reasonable diligence, if or when, examined in the wake of a tragic violent event. Even though HR departments are careful, they are stuck with incomplete and dated information.

One recent example of the consequences of hiring and failing to monitor an employee's criminal history occurred in early 2019 at the Aurora Illinois facility of the Henry Pratt Company where an employee shot and killed five coworkers during a termination meeting (Sanchez, 2019). The employee had a long history of violent behavior including a 2-year period of incarceration for felony assault. Although the employee passed an initial background check 15 years earlier, the initial check did not uncover his criminal history. Moreover, the employer failed to become aware of the numerous criminal arrests and convictions while he was an employee. Indeed, only after the shootings did the employee's complete criminal history come to light. Unfortunately, this is not an uncommon occurrence as the consequences of poorly conducted initial and inadequate or nonexistent ongoing criminal history background checks often make themselves apparent after incidents of workplace violence.

TSA Screening

TSA PreCheck is a credential that was designed to provide individuals entering the secure area of an airport with expedited entry. By having "pre-checked" their credentials, less screening is required at the point of entry. For example, liquids and electronics do not need to be removed from bags and shoes and jackets can be left on.

In September of 2022, 93% of TSA PreCheck passengers waited less than 5 min. To obtain membership, you must apply online, go to one of over 500 TSA PreCheck centers for an interview and fingerprinting. Once granted TSA PreCheck membership, you enter your KTN (Known Traveler Number) which is indicated on airport ID or a boarding pass, allowing access to the expedited search queue. The clearance is good for 5 years and costs "only" \$85. Renewals are available for \$70 (Transportation Security Administration [TSA], n.d. a).

Eligibility for TSA PreCheck is determined by a name and fingerprint based investigation of national and international databases and other sources of information. At the national level information is vetted through state and local police agencies, the Federal Bureau of Investigation, intelligence agencies, other government databases and sources of information. At the

international level information from international police organizations such Interpol as well as other sources of information are used. Beyond these sources of information, it may be inferred that any legally available source of information may and likely is used to assess eligibility. Disqualifying offenses are either permanently or interimly disqualifying for PreCheck eligibility. While some offenses are specifically disqualifying as they are listed as disqualifying offenses, other offenses are disqualifying, but are not specifically listed as such. These offenses are appropriately thought of as discretionary disqualifying offenses, which allow TSA discretionary authority in approving eligibility.

This process is effective in checking a person's security threat. A significant quality of which comes from the fact that the background check includes running fingerprints and background information through various government agencies such as the Federal Bureau of Investigation (FBI). For instance, fingerprints are vetted through the FBI's Next Generation Identification (NGI) system and Social Security Numbers are compared against SSA records (TSA, n.d. b).

This detail is significant because standard commercial background checks are not able to access government databases such as the FBI database. Indeed, the ability to access the FBI database is quite valuable in terms of employee background screening. Traditionally, the ability to run an FBI background check on potential employees has been limited to state or local government employee applicants or circumstances where licensing requirements mandate such checks. One of the more common types of organizations allowed to use the FBI database are public schools. As the ability to access FBI databases is limited, a significant advantage of using TSA PreCheck is access to government databases. Although the employer does not control what databases are searched and what is searched for, the use of TSA PreCheck as a pre-employment screen does allow indirect access to many databases traditionally not available to private organizations.

Another useful benefit of PreCheck as a pre-employment background check is the application process, which requires applicants to provide both a detailed criminal history background and explanation. Anecdotal evidence suggests that misrepresentations in these disclosures will likely result in a finding of ineligibility for TSA PreCheck. Ineligibility is likely even in those cases where misrepresentations involve offenses for which PreCheck might otherwise be issued. For instance, while it is obvious serious crimes, such as felony driving under the influence, would be specifically disqualifying as these offenses are felonies punishable by imprisonment of greater than a year. However, it is unclear whether less serious offenses such as misdemeanor driving under the influence are disqualifying as these are offenses subject to discretionary issuance as they are not specifically disqualifying. Although some of these lesser offenses may not preclude issuance, failure to disclose may result in ineligibility and creates a strong incentive for potential employees to accurately disclose their criminal histories. Ultimately, the incentive TSA PreCheck creates to be complete and forthcoming in the TSA PreCheck application is among the greatest benefits of using TSA PreCheck as a pre-employment screening device.

Disqualifying events: TSA PreCheck has 3 categories of offenses that are disqualifying for membership. Part A are permanent disqualifying criminal offenses. These include espionage,

sedition, treason, terrorism, crimes involving a transportation security incident, improper transportation of hazardous material, or unlawful possession of an explosive, murder, and violations of the Racketeer Influenced and Corrupt Organizations (RICO) Act.

Part B contains interim disqualifying criminal offenses. Applicants are disqualified if any of these offenses occurred within the last 7 years, or the last 5 years since prison release for a convicted offense. Part B offenses include firearms violations, extortion, money laundering, bribery, smuggling, immigration violations, distribution or possession w/ intent to distribute or importation of a controlled substance, arson, kidnapping or hostage taking, Rape or aggravated sexual abuse, assault with intent to kill, robbery, fraudulent entry into a seaport, or voluntary manslaughter. Part C disqualifies an applicant if they are wanted or under indictment for a felony listed under Part A or Part B.

Ultimately, approval for TSA PreCheck is at the discretion of the TSA and applicants may be disqualified for a host of other offenses such as domestic criminal violence convictions or other convictions resulting in imprisonment lasting longer than 365 days (Curtis, 2017). Can TSA PreCheck be revoked? TSA PreCheck can be revoked for violations of certain federal security regulations, such as access control violations, providing false statements, bomb threats, or bringing prohibited items to an airport. Duration of revocations vary based on the severity and repeated history of violations (TSA, n.d. c).

Additional Considerations

As the underlying security risks of dangerous employees are so high, many positive considerations support the use of TSA PreCheck for employee background screening. Indeed, few managers would be happy to know their business enabled the next Rodolfo Montoya. Nevertheless, there are many additional considerations before an organization adopts TSA PreCheck for employee background screening. Importantly, organizations should consider the risks of workplace violence in the context of a fabric of systems and procedures that work in unison to reduce these risks. No one system or procedure can assure complete security. Additionally, safety has to be achieved in harmony with other laws that restrict actions that could become unfairly discriminatory. For example, the Qualified Applicants Act in Illinois prohibits background checks before employment offers are given so that those that have served time can still gain employment without that time being a permanent disqualifier (National Safety Council, n.d.).

While we believe TSA PreCheck is a useful proxy for employee background screening, we do recommend several caveats in its use. First, not all potential employees will be able to pass the TSA PreCheck and some of these potential employees may represent suitable hiring risks. For this reason, we recommend employment be contingent upon applying for TSA PreCheck, but not necessarily contingent upon receiving TSA PreCheck clearance. In those instances where PreCheck clearance is denied it will be necessary to understand the reason why the employee is unable to receive clearance. Moreover, in some instances the reasons may be ones that do not

make hiring the employee an undue hiring risk, in others the reasons may be more onerous and not hiring the employee is likely the appropriate course of action.

Employers must also be careful to ensure that the process of acquiring TSA PreCheck is handled by the employee and not the organization's HR department. While the organization should reimburse the employee for the cost of the PreCheck, the actual process of obtaining the PreCheck should be the responsibility of the employee. The organization should only request verification from the employee that they have received a PreCheck or conversely that they have been denied. The key facet of using TSA PreCheck as an employee background screening tool is getting the employee to apply and knowing the results. In those instances where an employee has been denied, the employer should request that the applicant provide a copy of the denial letter. In most cases the denial letter will include an explanation for the denial. In cases of denials, the employer can then use the cause for the denial to determine whether or not to hire the applicant. It is important that potential employees, rather than the organization, make the TSA pre-application because some state and federal laws mandate that employers who use background checks advise employees of the reason for denying employment on the basis of a background check. With the organization simply requiring the potential employee to apply for TSA PreCheck, and to provide the employer with the results, the organization is not conducting a background check but rather collecting information useful in the hiring decision. Nevertheless, employers should seek legal advice to assess the ramifications of using TSA PreCheck as part of their hiring process.

CONCLUSION

In this manuscript we have sought to demonstrate that the challenge of providing a safe workplace is difficult but not insurmountable. Organizations have a responsibility to keep their workplace safe. Part of this process is screening new employees using background checks. Although many organizations purport to offer background checks, these organizations use publicly available information that is difficult to verify. The gold- standard of background checks are those conducted through the FBI database which consider official information from multiple government sources. Although accessible to a variety of governmental entities for new employee screening, the FBI database is not accessible by the vast majority of organizations. Only organizations that are required by law and approved by the Attorney General are allowed to use this database for employment screening.

In conclusion, we propose TSA PreCheck as a way to indirectly access FBI and other databases and improve employee background screening. Although primarily used to pre-screen travelers, the use of FBI and other databases makes PreCheck a valuable tool to evaluate security risks associated with potential job applicants. While failure to be approved for TSA PreCheck may not disqualify a person from employment, it does represent a red-flag warranting further investigation.

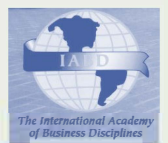
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