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# Decision-making styles and trust across farmers and bankers: Global survey results

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ABSTRACT

Understanding in which contexts professionals come to trust their gut is critical both for human relations as well as for human–computer interaction. A prominent viewpoint promotes a deliberate trust development approach for professionals in all industries and at all levels of organizations (people use good thinking). The use of intuition has also been related to trust development. There is little empirical research that illuminates the circumstances under which intuitive decision making versus deliberative decision making influences trust. Lack of trust in technology and information systems has been suggested as a bottleneck in advancement. Through a survey we aimed to better understand the phenomenon of intuitive decision making of farmers and bankers. The main research purpose is to compare and contrast decision making styles of two environmentally different professions from a heterogeneous sample from different countries. Our results suggest that one's sector plays a main role, when professionals determine if they can trust information and communication technologies (ICTs) in the workplace. We inform suggestions for practice and guide future research into this important area of managerial cognition and decision-making.

## 1. Introduction

With a growing world population expected to hit 8.5 billion people in 2030,[1] the subject of how farmers make decisions and use technology amidst calls for sustainable farming practices is becoming increasingly important. Technologies and information systems promise efficiency gains for farming, but evidence suggests that uptake of new technologies is lagging [1]. Lack of trust in technology and information systems has been suggested as a bottleneck in advancement [2].

In the current landscape of business and management, the dynamics of decision-making processes have undergone a transformative shift, particularly concerning the integration of technology and the cultivation of trust in digital environments [3]. Recognizing the pivotal role of professionals in assessing digital trust cues, this study delves into the nuanced interplay between intuitive and deliberative decision-making processes within two distinct yet impactful professions: farmers and bankers. To help understand, if farmers' decision-making behavior could help understand a lack of trust vis-à-vis technologies.

Studies of user decision-making processes reveal that intuitive thinking processes are crucial to the development of trust [4], but earlier studies failed to account for respondents' occupation and their work context. How do professionals determine if they can trust information and communication technologies (ICTs) in the workplace? In the dominant perspective, users consciously evaluate security regulations, user input, and other factors, leading to a very reasonable underlying trust calculation [5] based on extensive deliberation. Authors like Roghanizad and Neufeld [5], Liebowitz, et al. [6,7] highlight that unconscious thinking styles that reduce cognitive effort matter for trusting decisions [8,9]. Comparative research in thinking preferences (intuition and deliberation) in different professional fields provides useful perspectives for practitioners and designers [10–16]. We are guided by the assumption that the preferences for intuition and deliberation are shaped by professional habitus [17] of farmers, or any profession for that matter. To control for environmentally different professional sectors, we compare thinking preferences of farmers with bankers, as they relate to trust.

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Our study embarks on an empirical exploration to unravel the intricacies of intuitive decision-making processes among farmers and bankers. The focal point of our investigation is to compare the decision-making styles within these two professions, which operate in environmentally disparate contexts. This research endeavors to draw insights from a heterogeneous sample spanning different countries, shedding light on the factors influencing trust and decision-making in the digital age. In this context, the relevance of technology use and the establishment of trust among farmers stand out as paramount considerations. Agriculture, a sector deeply entrenched in traditional practices, is undergoing a digital revolution, with farmers being exposed to information and communication technologies (ICTs) for diverse aspects of their work. The extent to which these professionals place trust in ICTs holds crucial implications for the sector's efficiency, innovation, and overall sustainability.

This study used a survey instrument based on 628 responses of working adults in two professions, contributing towards the overarching question raised explicitly in the literature on professions and administration: Is there a propensity of farmers to use intuitive rather than deliberative thinking? How do these differences play out for trust in technologies in comparison to professions that are more detached from nature?

To empirically corroborate the assumptions about thinking preferences connected to particular professions we adopt a dual-process reasoning theory [18–21]. This study addresses the calls by [14,21,22] for more local and cultural-specific theories of farmer's decision making in management and administration. In this work, we explore the two cognitive preferences from dual-process theory [17–20]: the intuitive approach, the deliberative approach and a third type, a combination of both, the preference for wise thinking. After discussing how "dual-process" reasoning has hitherto been established conceptually in the literature on decision-making, we review the applied literature on decision making in two professions, farming and banking. We concur with prior work [22] to consider professional habitus and a peculiar way of thinking, when using knowledge that is truly adapted to the work at hand, the circumstance, and the context in which it is being used. As we embark on this empirical journey, we aim to contribute substantively to the understanding of intuitive decision-making processes and their implications for technology use in professional settings. By focusing on farmers and bankers, we aim to discern sector-specific patterns that illuminate the complex interplay between decision-making styles, trust, and technology use. Our findings not only inform practical recommendations but also chart a course for future research, elucidating the intricate landscape of managerial cognition and decision-making in the contemporary digital era.

We advance knowledge of the field by theoretically and empirically comparing whether and how occupation affects the differences in intuition and deliberation of decision-makers drawing on a global sample. The article is organized as follows. The theoretical background on the behavioral dimension preference for intuition/preference for deliberation (PID) is outlined [23,24]. Current literature on decision-making of farmers and bankers is reviewed. The final section provides methodology and discusses the results of the analysis. The paper concludes by highlighting contributions and limitations with a discussion of its implications for future research and practice.

## 2. Theoretical background and research hypotheses

### 2.1. The dual process theory of thinking

The dual process theory of thinking [19,25–29] encompasses a set of cognitive approaches to decision-making, including the preference for intuition/preference for deliberation [23,24]. "Affectively charged judgments that arise through rapid, non-conscious, and holistic associations" (p. 33) is how Dane and Pratt [30] characterize intuitions. Having the ability to control one's intuition seems to be a must for making sound decisions in any field [8,31,32]. Simon [15] perceived pattern recognition to be the most important step in making intuitive decisions, as it provides professionals with instant access to their tacit knowledge base and the study of decision-making is an area of work life that may need more study [33]. The preference for intuition/preference for deliberation was measured in this study by employing the two distinct thought processes defined in decision-making psychology [23,24]. System 1 (intuition and affect) and System 2 (deliberation, also referred to as analysis and reason, or critical thinking) are two ways of thinking [23,24]. Both are necessary for humans to make sound evaluations, selections, and solutions. People tend to choose one mode of thinking over the other, even when they are both available to them [23,24]. This article explores whether one's profession influences this tendency.

Virtue in decision-making has recently gained attention [33–37]. Sadler-Smith [38] writes that one's "preferences for thinking styles may enable or impede the habituation of virtue". This is to say that knowing one's preferential cognitive mode, can aid to identify blind spots, or cognitive biases. Mayer, et al. [39] suggest that an individual's decision preference should be taken into account as it affects human or machine generated advice-taking, e.g. when humans generate forecasts. Hitherto, an investment choice context has been used by Mayer, et al. [39] which may be considered to trigger mostly deliberative thinking. In contrast, our study includes the general choice contexts of the professions (intuitive and deliberative), and without referring to particular objectives of the work task. To the best of our knowledge, this is the first study to formally investigate the topic of decision preference in two professions focusing on the behavioral dimension preference for intuition/preference for deliberation [23,24] in two sectors. When people display both high preference for intuition and deliberation, we consider this as a third category, the wise type of thinking, that can be associated with virtue, or practical wisdom [33,40]. Recent work suggests that it is feasible to separate wise decision-making from tried-and-true intuition and careful deliberation [40]. In spite of the increasing use of algorithms, when the content is dynamic and the task requires interpretation, however, the advantage shifts in favor of human decision-makers [41]. Research in business offers the phronesis concept (also known as practical wisdom) as a possible "cure" for seemingly fixed decision making preferences, given the frequency of dominating decision making preferences in various industries [40]. The three decisional preferences have been documented to materialize as three distinct decision making profiles: intuitive, deliberative and "wise".

Some earlier works analyzed behavioral preferences of farmers [42] and bankers [43] separately. The following sections review recent works in farmer decision-making (Section 2.2) and banker decision making (Section 2.3).

### 2.2. Reviewing the role of the professions' style in farmer decision-making

We searched the scientific databases Scopus and Web of Science using the terms 'intuition' and 'agriculture' and 'farming' to determine the extent to which previous agricultural management research has addressed the role of intuition in farmer decision-making. Additional search terms used were "farmer decision-making" and "intuition". Twelve papers, all published in 2019 or later, were uncovered after filtering 83 search results for relevance to management decision-making. We considered the works from 2019 onwards, after the review by von Diest, et al. [16] covered the literature.

The decision-making processes of farmers are intricate and multifaceted, influenced by various individual, contextual, and socio-cultural factors [44–46]. One important aspect to consider is the extent to which farmers rely on intuition or engage in critical thinking when making decisions related to their farming operations [47]. The utilization of intuition in farmer decision-making is determined by various factors, including farmers' beliefs, tacit knowledge, perceptions, capacity to

adopt, information sources, financial and regulatory considerations, and personal experiences as well as extreme weather events [48]. For example, McClure, et al. [49] explain that generally, laypeople prefer single-cause explanations for extreme weather events and are likely to disregard whether possible causes covary with these events. This inclination toward simpler explanations can influence the degree to which farmers depend on intuition as against analyzing intricate underlying influences. Farmers' experiences with climate change impacts and extreme weather events can influence their decision-making processes, including their reliance on intuition [50].

Additionally, the specific factors affecting crop production and farming decisions may differ based on the agro-ecosystems and local contexts. For instance, a study conducted in Bhutan found that farming decisions were influenced by a combination of climatic and non-climatic factors, with irrigation availability, farm labour, crop seasonality, and crop damage being significant considerations [49]. Overall, the differences among farmers regarding the use of intuition in decision-making can be attributed to various factors, including their beliefs, sources of information, experiences with extreme weather events, perceptions, and specific contextual considerations [50]. Understanding these differences is crucial for developing effective strategies to support farmer decision-making for example for climate change adaptation in agriculture.

Several studies have examined reasons why farmers generally tend to rely on intuition for decision-making. A primary reason is that intuition enables farmers to leverage their tacit knowledge, valuable expertise, and practical wisdom developed through years of experience and observation [16,51,52]. Making quick intuitive decisions enables farmers to mitigate risks and seize opportunities in a timely manner when in complicated situations, so farmers can allocate their resources efficiently, minimize potential losses and maximize potential gains, and make effective choices under time constraints [53].

Furthermore, Mulu, et al. [54] highlight that intuitive farmer decision-making occurs due to farmers' emotional engagement and connection to their land. Consequently, farmers may prioritize decisions that preserve their customs and maintain traditional farming practices. Such emotional connections motivate intuitive decisions that prioritize lasting sustainability, cultural preservation, values-based choices, resilience, and personal satisfaction [55,56]. In addition, other studies have found that the type of risk faced by farmers, farmer expertise, perceptions, environmental circumstances, and characteristics of the decision made [57] all impact farmer's propensity to use intuition.

From the foregoing literature, it is evident that intuition has an invaluable role in farmer decision-making. It is a prevalent decision-making system among farmers, regardless of their level of expertise [16] and provides access to tacit knowledge. Nuthall [13] suggests that intuition is a major factor that contributes to excellent managerial ability among farmers. Subsequently, Nuthall [55] explains intuition as a decision system in farming and emphasizes that since most farm decisions are made through intuition, efforts are required to improve decision-making skills in farmers. However, it is vital to point out that intuition could be trained and upgraded to strengthen accuracy and consistency. Self-criticism skills, such as utilizing a decision journal and engaging in reflection and consultation with experts, may result in improved decisions [58]. Moreover, incorporating technology, such as ICTs, data, and other decision support systems, may shift farmers' decision-making strategies from intuition-based to technology-based, allowing for improved agricultural productivity [52,56].

In the face of numerous challenges and uncertainties related to farmer decision-making processes, such as unfavorable weather conditions, market trends, and resource management, critical thinking and formal decision support systems assist farmers to analyze these complex circumstances and make informed decisions [57,58] based on practical evidence [59].

Despite these advantages in the use of deliberate thinking and formal decision systems, several studies indicate that farmers typically perceive these as needing extensive data input or specialized knowledge, ensuing in extra work and potential barriers to adoption [60]. Intuition, in contrast, provides farmers with a simpler and more straightforward decision-making approach with no dependence on external tools or technologies [13,14,55,61]. Moreover, there might be a cultural or personal preference for using intuition among farmers [62]. Intuition is valued in farming communities and may be seen as an important part of farmers' identity and tradition [13,14,16,51,52,55,61].

The preference for intuition in farmer decision-making is also associated with the belief that it influences improved outcomes and exhibits an innate insight of farming practices [16,51,52]. While formal decision support systems proffer empirical data and analysis, farmers habitually prioritize tacit knowledge, such as intuition, that is built over years of experience and observation [16,51,52]. They value the nuanced understanding and practical wisdom gained through their personal involvement in farming. In addition, von Diest, et al. [16] point out that developers of formal decision support systems and tools for critical thinking and cognitive analysis fail to take into consideration the existing connections between farmers' explicit knowledge and their decision processes. Moreover, farmers' views are in some instances not solicited during the design of these decision support systems and tools until the completion of the final product [16,63].

Even though there exist a wide array of decision support systems and tools for deliberate thinking to aid farmer decision-making, studies reveal that there is a low adoption of these tools and systems [64,65]. Rossi, et al. [66] emphasize that some farmers lack the requisite knowledge of technologies, a factor that accounts for low adoption rates of technology especially in developing countries. In these countries, this phenomenon is more evident since farmers in those countries usually perceive these options as quite risky and uncertain [56,67]. Accordingly, the utilization of decision support systems and critical analysis tools is deemed hectic by farmers familiarized with employing intuitive, experience-based decision-making approaches.

### 2.3. Reviewing the role of the professions' style in bankers' decision-making

Using Google Scholar and ScienceDirect, we looked for journal publications published up until 2023. In the context of the rational decision-making literature, we collected information about rational decision-making of bankers three times, using different range of criteria with an emphasis on the following keywords: 1. "bankers", "decision making", "rational thinking", 2. "bankers", "decision making", "deliberate thinking", search no. 3. "bankers", "decision making", "critical thinking".

The hit rate varied. The first search yielded 4700 articles. Four relevant articles could be identified here after reviewing the abstracts. 2 articles were taken out (no scientific article, no direct reference to bankers). 2 articles were left in this search. In the second search, one relevant article could be identified from 245 hits, but reading the whole article, it became clear that the bank reference was missing. So, there was no relevant literature here. 20 900 hits resulted in search no. 3. However, most of the articles dealt with learning and teaching, so that only two were assessed as relevant based on the abstract. However, it turned out that these articles were not relevant to the topic either, so that this search did not yield any hits. A search in ScienceDirect did not yield any additional relevant articles on the topic. A total of 2 relevant articles on the rational decision-making behavior of bankers were identified by 2023.

While searching for academic articles in the field of intuitive decision-making by bankers until the year 2023, the keywords "bankers", "decision making", "intuitive" were used in google scholar and ScienceDirect. We narrowed the results down to 15 abstracts from 35 200 total hits. Eight of the original fifteen were eliminated due to lack of topic concentration or non-academic article status upon closer inspection. The results of another search in ScienceDirect were the same. So, we were down to the final 7.

Two studies assume a predominant proportion of rationality in bankers' decisions [68,69]. Anderson and Thoma [70] state that research focuses on qualitative methods for understanding bankers' intuition and gut feeling. According to their research, no previously published study has taken a closer look at analytical, rational, and reflective decision-making processes. Based on semi-structured interviews with financial traders, Anderson and Thoma [70] found that respondents had difficulty distinguishing between their intuitive and analytical decision-making styles. None of the respondents used the word "analytical" to characterize their actions when reading, researching, and assessing data. After these mistakes were remedied, it became clear that bankers viewed the promise of data-driven rational decision making as a "savior", particularly during periods of loss. It follows that findings from other studies suggesting the outsized use of intuition in the decision-making processes of bankers are likely wrong or skewed for similar reasons of bias [70]. In the findings of Thoma, et al. [71], financial traders score higher than other professional groups on the Cognitive Reflection Test (CRT), demonstrating the high importance of rationality among bankers. They do not seem to favor more intuitive modes of thinking, and they see themselves as primarily rational when making decisions. Technically savvy traders in the financial markets never use heuristics [71]. Bankers, who were found to engage in more deliberate thought processes before making decisions [71], have a lower risk appetite correlation.

Most studies deal with the interplay between intuition and rationality as well as their influencing factors in bankers' decisions [66,69,72–75].

From the point of view of irrational decision-making, it has been shown that both rational (fundamental) factors and behavioral factors (e.g., intuition) influence the credit decision-making process in the banking sector. Intuition is additionally used to make a decision [74].

There are various findings on how important bankers see intuition compared to rational criteria. Some loan officers see gut feelings as more valid indicators of the worthiness of the application than the financial data [73]. Others see it as an important add-on component to rational analysis, the meaning of which depends on the nature of the decision. For example, bankers' day-to-day decisions tend to be made intuitively and larger decisions tend to be rationally based. Often, intuition is not enough to justify a decision in an organization. They represent hypotheses that must be confirmed or refuted by rational criteria. In this respect, decisions can be made intuitively, e.g., there is a lack of time, but they should also be supported with rational analyses if possible [72].

Technical traders, in comparison to fundamental traders, make their decisions more intuitively. However, they use rational analysis as a means of verification in case they are unsure of their intuition. In uncertain situations, managers in the banking sector increasingly use their intuition to make decisions [72,75]. Especially in larger organizations based on hierarchies and rules, the pressure to prove through rational arguments is relatively high. Accordingly, analytical evidence is used to substantiate intuition to convince colleagues or superiors. This is especially true for younger bankers, while experienced and veteran bankers seem to be given permission to make intuitive decisions and are not questioned as much [72].

Experience has been identified in several studies as an important factor influencing bankers' preference for intuitive decision-making behavior [72,75]. Experience is considered by bankers to be very important in decision-making. They are an important basis for their intuition, which they see as a hedge in uncertain situations. They are therefore also an important hiring criterion when hiring new employees [75]. However, experience alone is not enough to make good decisions, so rational analysis is also a way for experienced managers in the banking sector to ensure the quality of decisions [76].

### 2.4. Wise decisions, conceptualized as a combination of intuitive and deliberative styles

From the preceding discussion of the literature we can note that some farmers (as well as bankers) use a combination of intuition and deliberation (this is what we refer to as the wise type of decision-making). The PID scale is a well-established tool in cognitive psychology that was not used in those earlier investigations of the two professions. Using the PID scale allows to make comparisons across professions, also the scales used by authors such as Nuthall [61] are closely tied towards farmer practices in single country and farming contexts. Authors like McCown [70] document that there are farmers using combinations of intuition and deliberation. That such combinations of intuition and deliberation are necessary and common was already suggested in the broader management literature by Hodgkinson and Sadler-Smith [29], Sadler-Smith [38], Sadler-Smith and Burke-Smalley [71], see Section 2.1, but it was so far only explained conceptually.

This article combines the literatures on farmer's decision-making with the literatures on practical wisdom to fill in the research gap left by previous studies on farmers' decision-making styles [16]. While the farming industry has been associated with a preference for intuition, the banking industry provides us with a control group of specialists who are predominantly in sync with a preference for deliberation. We assume a connection between decision-making styles and people's propensity to trust.

The present study proposes the following **hypothesis** based on the above review of the literature:

H1: There are significant differences in levels of trust in management among individuals from the farming and banking sectors, based on their decision-making styles (analytical, wise, intuitive).

### 2.5. Trust in technologies

To determine trust in technologies with a dual process reasoning theory approach [5] there is a lack of comparable data and the examination of choice patterns. Typically, these studies only include professionals from a single industry or a single nation [77]. We take a profession to be made up of similar work practices, which are distinct enough to constitute relatively stable cognitive preferences [33], which are taken into account in a comparison between two different groups. We need to be able to tell the difference between low, medium, and high degrees of intuitive or deliberate processing.

Several studies have found various factors that inhibit farmers from trusting technology. These factors include economic barriers, behavioral factors, lack of knowledge and trust, shortage of available technologies, inefficient agricultural advisory services, heterogeneity of farming systems, policies and regulations, and risk factors [78–81]. Also, farmers' perception of a technology's capacity to function as assumed in certain circumstances or to finish a necessary duty can also hinder trust [82,83]. Furthermore, farmers' trust in technology may be reduced by their perception of the ease of utilization and effectiveness of the technology [84].

People working in banking/finance often interact with sophisticated technological systems that are crucial for their work, such as data analysis software, trading platforms, or digital payment systems. Experienced bankers know, when to use their gut feelings and when to back them up by using data systems [72]. Therefore, bankers should be open to technological systems.

H2: There are significant differences in levels of trust in technologies at the workplace among individuals from the agriculture and banking sectors, based on their decision-making styles (analytical, wise, intuitive).

### 2.6. Trust in information systems

Third, as laid out in the literature above, to hone own's expertise, farmers have to be mostly outside, closer to nature to hone their intuition and bankers have to be close to their ICT devices to hone their deliberations. Therefore, we expect significant differences of trust towards information systems across the two sectors.

Bad personal experiences can significantly influence farmers' trust in formal information sources negatively. When farmers go through negative experiences with recognized information sources, such as obtaining erroneous or ineffective information, it can lead to cynicism and misgivings about those sources and other similar sources [85,86]. Farmers may become doubtful about relying on these sources for help on common agricultural methods such as pest and weed management or other agricultural practices [87]. As an alternative, they are likely to resort to other sources of information, such as their personal networks or trusted individuals such as gatekeepers and opinion leaders within their community [88]. In such instances, the trust established in these unofficial, yet naturally existing networks and connections are most likely to dwarf the confidence retained in formal information sources [89]. Moreover, farmers' personal experiences and indigenous knowledge acquired through practical farming experiences can highly influence their decision-making and consequently erode their trust in formal information sources [16]. Thus, it is crucial for formal information sources to address farmers' concerns' provide accurate and relevant information, and establish trust through effective communication and engagement with farmers [90].

Bankers who use the analytic decision-making style may trust information systems more because they perceive them as capable of identifying and managing risks. This trust in risk assessment can enhance trust in the reliability and security of information systems.

H3: There are significant differences in levels of trust in information systems at the workplace among individuals working in the farming and banking sectors, based on their decision-making styles (analytical, wise, intuitive).

## 3. Methodology

### 3.1. Sample and data collection

The data were collected as part of a larger online survey [91] between March and August 2020. The participants filled in the online questionnaire after invitations, which were sent as snowball sampling through social media by the first and the fifth author and their professional and private networks. These data were analyzed using SPSS V26. Participants were 628 employees working in agriculture (n = 173) and banking (n = 455) sectors from around the globe (more than 30 countries). The English version of the survey was translated into 12 different languages with using a five-step translation and back translation methodology with the help of experts from different cultures. The age ranged from 18 to 59 with percentages of 21% for the 19–28 age group, 26.4% for the 29–38 age group, 38.9% for the 39–48 age group, and 10% for the 49–58 age group, and 3.6% for the age of 59 years and above. Gender distributed as 39.6% female, 5.7% non-binary, and 54.6% male. The job experience ranged from less than one year (8.6%), 1–3 years (20.8%), 4–10 years (47.2%), 11–20 years (19.7%), 21–30 years (2.9%), 31–40 years (0.6%), to more than 40 years (0.2%).

### 3.2. Instruments

For the decision-making styles, the Preference for Intuition and Deliberation Scale [23] was used. The 14-item scale measures individuals' preferences of intuitive or deliberative decision-making styles on a 4-point Likert response type from 1 (strongly disagree) to 4 (strongly agree). A higher score indicates a greater propensity for the corresponding approach of making decisions. Sample items are "*Before making decisions I think them through*" for deliberation and "*I listen carefully to my deepest feelings*" for intuition. For validating the scale measurement, we conducted confirmatory factor analyses (CFA) with maximum likelihood estimation method to confirm the determined factorial structures. For the cut of values of model fit, the ratio of chi-square to degrees of freedom (X2/df < 3), Tucker Lewis index (TLI > 0.90), comparative fit index (CFI > 0.90), and root mean square error of approximation (RMSEA < 0.08) were used for the acceptance decision. We validated the factorial structures across all industries and the entire sample. Cronbach's alpha coefficients, which measure internal consistency, were also been estimated.

We also employed three settings centered on management, technology, and information systems to gauge employees' trust at the workplace. The administrative structure consisted of four distinct tiers (4 items), from first-line supervisors to CEOs, C-suite executives, and their own teams of supporters and middle managers. The question "*What is the level of your trust with the following people who have direct or indirect access*" was asked on a 4-point Likert response type from 1 (not trusted at all) to 4 (highly trusted). Technology context included a variety of technologies (6 items) that help to increase the quality of work processes such as user benefits, integrity of process, control and security, accuracy of data, performance, reliability, and business continuity. The question "*What is the degree of the following features in terms of your confidence in any digital technology in your workplace?*" was asked on a 4-point Likert response type from 1 (not trusted at all) to 4 (highly trusted). Information systems context consisted of systems (6 items) that were used in the workplace such as executive information system, financial planning system, sales management system, management reporting system, human resource system, and payroll system. The question "*What is the degree of the following features in terms of your confidence in any information systems in your workplace?*" was asked on a 4-point Likert response type from 1 (not trusted at all) to 4 (highly trusted). For testing the validity and reliability of measuring employees' level of trust, we conducted explanatory (EFA) and confirmatory factor analyses (CFA) with the maximum likelihood estimation method and calculated Cronbach's alpha coefficients. The entire item battery as well as the data are available upon request.

## 4. Results and discussion

### 4.1. Results

The results of CFA show that the two-factorial construct of PID has acceptable fit indices for the whole sample (X2/df = 2.25, TLI = 0.98, CFI = 0.98, RMSEA = .044), agriculture (X2/df = 1.54, TLI = 0.98, CFI = 0.98, RMSEA = 0.056) and banking (X2/df = 2.60, TLI = 0.96, CFI = 0.97, RMSEA = 0.059) sectors after minor modifications (11 items confirmed). After confirming the factorial structure, the calculated Cronbach's alpha coefficient of deliberation was 0.88 for the whole sample, 0.91 for agriculture, 0.86 for banking; intuition was 0.87 for the whole sample, 0.93 for agriculture, and 0.83 for banking. After establishing the instrument's validity and reliability, we performed a cluster analysis on the scale to look at different combinations of decision-making preferences. High and low conditions, as well as their permutations, were considered for each decision-making preference. The K-means clustering method (Hartigan-Wong algorithm) presented an optimal solution with three clusters (total sum of square (SoS) is 870.3; between is 582.7); cluster 1 (SS is 23.6), cluster 2 (SoS is 51.2), and cluster 3 (SoS is 212.7). The means of cluster 1 (Intuition: *represents a group with high intuition and low deliberation*) were 3.85 for intuition and 1.41 for deliberation; cluster 2[2] (Deliberative: *represents a group with high deliberation and low intuition*) were 1.65 for intuition and 3.81 for deliberation; and cluster 3 (Wise: *relatively high levels of both intuition*

[2] Cluster 2 referred to as «Analytic» in the tables and figures.

**Table 1**
Descriptive statistics for clusters.

| | N | SoS | Intuition | | | | Deliberation | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Skew. | Kurt. | Mean | SD | Skew. | Kurt. |
| Intuition (Cluster 1) | 76 | 23.6 | 3.85 | 0.37 | −1.95 | 2.47 | 1.41 | 0.42 | 0.56 | −1.20 |
| Analytic (Cluster2) | 165 | 51.2 | 1.65 | 0.43 | 0.26 | −0.80 | 3.81 | 0.35 | −1.76 | −2.1 |
| Wise (Cluster 3) | 387 | 212.7 | 2.80 | 0.52 | 0.17 | 0.43 | 3.01 | 0.53 | −0.16 | 0.00 |

SoS = Sum of square, Skew. = Skewness, Kurt. = Kurtosis.

**Table 2**
Descriptive statistics of trust in the workplace.

| | Agriculture | | | | | Banking | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | Skew. | Kurt. | N | Mean | SD | Skew. | Kurt. |
| Management trust | 162 | 2.82 | 0.84 | −0.21 | −1.12 | 411 | 3.08 | 0.71 | −0.67 | −0.22 |
| Intuition | 46 | 2.33 | .85 | .80 | −.40 | 27 | 2.17 | .74 | 1.34 | 1.16 |
| Analytic | 39 | 3.05 | 0.98 | −0.62 | −1.22 | 122 | 3.34 | 0.75 | −1.42 | 1.06 |
| Wise | 77 | 3.00 | 0.62 | −0.41 | −0.14 | 262 | 3.05 | 0.59 | −0.50 | 0.29 |
| Technology trust | 170 | 3.27 | 0.74 | −1.10 | 0.68 | 443 | 3.52 | 0.56 | −1.11 | 0.54 |
| Intuition | 46 | 3.69 | 0.40 | −1.33 | 0.86 | 28 | 3.88 | 0.35 | −2.04 | 2.91 |
| Analytic | 39 | 3.04 | 0.93 | −0.79 | −0.59 | 125 | 3.79 | 0.39 | −2.01 | 1.98 |
| Wise | 85 | 3.15 | 0.68 | −0.78 | 0.38 | 290 | 3.37 | 0.58 | −0.78 | 0.00 |
| Information systems trust | 141 | 3.01 | 0.83 | −0.47 | 0.37 | 344 | 3.22 | 0.62 | −0.62 | 0.05 |
| Intuition | 46 | 2.92 | .80 | .09 | −1.74 | 26 | 2.65 | .55 | .92 | .95 |
| Analytic | 38 | 3.09 | .99 | −.66 | −1.29 | 102 | 3.64 | .44 | −1.31 | .89 |
| Wise | 57 | 3.04 | .72 | −.85 | .85 | 216 | 3.09 | .59 | −.65 | .74 |

SoS = Sum of square, Skew. = Skewness, Kurt. = Kurtosis.

*and deliberation*) were 2.80 for intuition and 3.01 for deliberation (Table 1). All these results indicated three types of decision-making styles intuitive, deliberative, and wise, which is conceptualized as a combination of both.

The EFA results for the complete sample of trust in the workplace scale showed that the scale was three-factored, with 14 items (factor loadings ranging from 0.47 to 0.85) explaining 56.7% of the total variance. Accordingly, the CFA results show that the three-factorial construct had acceptable fit indices for the whole sample (X2/df = 2.71, TLI = 0.96, CFI = 0.97, RMSEA = 0.052), agriculture (X2/df = 2.64, TLI = 0.96, CFI = 0.94, RMSEA = 0.076), and banking (X2/df = 2.64, TLI = 0.95, CFI = 0.94, RMSEA = 0.060). The calculated Cronbach's alpha coefficients of management ranged from 0.79 to 0.86, technology ranged from 0.82 to 0.89, and information systems ranged from 0.84 to 0.92 for the samples, indicating the validity and reliability of the instrument. Table 2 displays the mean trust levels and decision-making styles of employees in the agricultural and banking industries.

Before testing the hypotheses, the homogeneity of variance analysis showed that group variances were not equal ($F = 6.74$ (562), $p < 0.01$). This result highlighted the need to conduct group comparisons with the aid of a non-parametric test. For that reason, Kruskal and Wallis [92] tests were adapted for comparing sectoral and decision-making style groups with different sample sizes. The results of the Kruskal Wallis tests indicated that there are significant differences among groups which are composed of three different decision-making styles (intuition, analytic, wise) and two different sectors (agriculture, banking). The hypothesis H1 is therefore supported. For the six different groups there were significant differences in management trust ($\chi^2 = 86.9$, df = 5, $p < 0.01$), technology trust ($\chi^2 = 113.9$, df = 5, $p < 0.01$) and information system trust ($\chi^2 = 83$, df = 5, $p < 0.01$), indicating multiple comparisons between pairwise groups. We have determined W values for each pairwise comparison using the Dwass–Steel–Critchlow–Fligner technique (Table 3). By this procedure, a contrast is considered significant if the following inequality is satisfied

$$W_{ij} = -\frac{n_i\left(n_i+n_j+1\right)}{2} \Big/ \frac{n_i n_j}{24}\left[n_i+n_j+1-\frac{\sum_{b=1}^{g_{ij}}\left(t_b-1\right)t_b\left(t_b+1\right)}{\left(n_i+n_j\right)\left(n_i+n_j-1\right)}\right] > q_{\alpha,k}, \text{for } 1 \le i \le j \le k \quad (1)$$

- where $q$ is a quantile from the normal range distribution for $k$ groups, $n_i$ is the size of the $i$th group, $n_j$ is the size of the $j$th group, $t_b$ is the number of ties at rank $b$ and $W_{ij}$ is the sum of the ranks for the $i$th group where observations for both groups have been ranked together.

Due to the findings, trust in the workplace varies considerably among industries and decision-making preferences. Management trust is much higher among employees with analytic and wise styles than among employees with intuition styles in the banking and agriculture sectors (W varied from 4.37 to 8.09, p 0.05). The level of trust in management in the banking industry is highest among those with an analytic style (M = 3.34, SD = 0.75), and lowest among those with an intuitive approach (M = 2.17, SD = 0.74).

Trust in technology is highest among people who use intuition (M = 3.69, SD = 0.40 for agriculture; M = 3.88, SD = 0.35 for banking), and among people who use a deliberative style in the banking industry (relative to those who use wise and deliberative styles in agriculture and also wise style in the banking industry; W ranged from 8.25 to 11.34, p 0.01). Thus, the second hypothesis is partially supported. Employees who prefer the deliberative style in the banking sector had the highest level of trust in the information system compared to those who favor other decision-making styles in both sectors (W varied from 7.31 to 11.42, p 0.01). In addition, people who make prudent (wise) decisions in both industries have higher trust in information systems than farmers who rely on their gut instincts (W = 4.20–5.60, p 0.01). The results partially supported the third hypothesis.

All these results present the conclusion that the deliberative decision-making style positively influences establishing trust in management, trust in technology and trust in information systems.

These three different contexts of trust in working environments can be further supported to the extent that preferences for ways of thinking about issues may be influenced. For the banking sector an intuitive style can help to foster trust in technology. Also, for the agriculture sector, the intuitive style was found to foster trust in technology. When the intuitive style is used together with the help of the deliberative style, to form the wise decision making type, higher levels of trust in management and information systems are generated in the agriculture sector (Fig. 1). We recommend that the preference for intuition, common among farmers, is ideally supplemented through the addition of deliberation to generate higher levels of trust both towards management and information systems.

**Table 3**
Kruskal Wallis test results.

| | | Management trust | | Technology trust | | Information systems trust | |
|---|---|---|---|---|---|---|---|
| | | W | p | W | p | W | p |
| Agriculture-intuition | Banking-intuition | −0.98 | 0.98 | 3.82 | 0.08 | −1.42 | 0.92 |
| Agriculture-intuition | Agriculture-analytic | 4.37 | 0.03 | −4.92 | 0.01 | 1.43 | 0.92 |
| Agriculture-intuition | Agriculture-wise | 6.40 | 0.00 | −6.65 | 0.00 | 1.32 | 0.94 |
| Agriculture-intuition | Banking-analytic | 8.09 | 0.00 | 3.54 | 0.12 | 7.31 | 0.00 |
| Agriculture-intuition | Banking-wise | 7.93 | 0.00 | −5.02 | 0.01 | 1.75 | 0.82 |
| Banking-intuition | Agriculture-analytic | 4.52 | 0.02 | −6.57 | 0.00 | 2.68 | 0.41 |
| Banking-intuition | Agriculture-wise | 6.81 | 0.00 | −8.04 | 0.00 | 4.20 | 0.04 |
| Banking-intuition | Banking-analytic | 7.63 | 0.00 | −1.52 | 0.89 | 8.91 | 0.00 |
| Banking-intuition | Banking-wise | 7.90 | 0.00 | −7.23 | 0.00 | 5.60 | 0.00 |
| Agriculture-analytic | Agriculture-wise | −1.62 | 0.86 | 0.05 | 1.00 | −1.59 | 0.87 |
| Agriculture-analytic | Banking-analytic | 1.56 | 0.88 | 8.25 | 0.00 | 3.45 | 0.14 |
| Agriculture-analytic | Banking-wise | −1.65 | 0.85 | 2.38 | 0.55 | −1.88 | 0.77 |
| Agriculture-wise | Banking-analytic | 6.29 | 0.00 | 11.34 | 0.00 | 7.95 | 0.00 |
| Agriculture-wise | Banking-wise | 0.72 | 1.00 | 3.80 | 0.08 | 0.39 | 1.00 |
| Banking-analytic | Banking-wise | −7.97 | 0.00 | −11.08 | 0.00 | −11.42 | 0.00 |

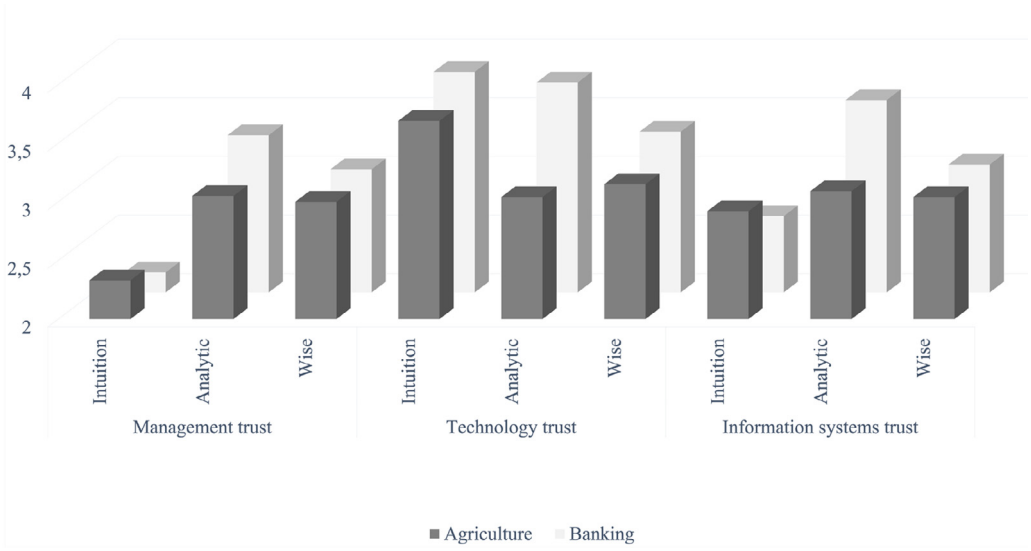


**Fig. 1.** Trust level differences.

### 4.2. Discussion

The findings indicate that belonging to a specific profession can have a significant impact for deliberative thinking and intuitive or affective thinking as it relates to trust. Commonalities between professions, regardless of the variables studied, are sometimes predictable and sometimes surprising.

Intuition- and deliberation-based decision-making is crucial for trust in human relationships, as well in technologies and information systems. Given uncertain times, improving mutual understanding cannot be overrated. Business administration with a foundation in behavioral science can help to build and sustain practical wisdom [31].

Deliberative and wise decision-making is based on critical thinking and systematic evaluation. In the banking sector, deliberative decision-making is important and backs up intuitive thoughts. It is normal to use analytics or to combine analytics with intuition [72]. This can contribute to higher levels of trust in management, as all employees use a similar decision-making style and therefore sense, that decisions are based on deliberation, evidence, and thoughtful consideration.

Moreover, analytical decision-making methods, which are founded on figures and careful information gathering, appear transparent and grounded in clearly articulated procedures. As a result, employees in the banking industry may be more willing to put their faith in those in control (managers) because they know the data they are receiving is reliable.

Experienced bankers often use intuitive decision-making styles [72, 75], potentially leading them to assume that management lacks the expertise they rely on. When managers see their superiors as incompetent or ill-informed, it undermines trust. Deliberative decision-making fosters a culture of consistency and well-structured processes, enhancing trust in management.

Intuitive decisions deviating from conventional approaches carry high risks, posing potential harm to a manager's career. Seeking feedback from others becomes crucial for managers, ensuring their intuition aligns with different perspectives [72]. Bankers relying on intuition may view technology with a certain willingness to explore, considering it beneficial to validate their gut feelings, thereby fostering higher trust levels.

However, bankers with wise and intuitive decision-making may harbor concerns about system failures or cybersecurity threats, leading to a lower level of trust (for different study results see also, [8]). Convincing them of the security and robustness of those systems becomes imperative. On the other hand, bankers employing the deliberative decision-making style trust information systems to a greater extent, perceiving them as capable of identifying and managing risks, ultimately enhancing trust in their reliability and security.

The banking sector must stick to strict regulations. Bankers who use the deliberative decision-making style may value information systems that comply with them. If the information systems meet the industry requirements, the deliberative bankers may have a higher level of trust

in the capacity of information systems to support secure and compliant operations.

Conversely, bankers with wise or intuitive decision-making styles resistant to embracing technological advancements may perceive it as unreliable compared to established practices, resulting in a lower level of trust. Their preference for personal judgment reinforces their reliance on assessments over information systems' outcomes. The findings of this study reveal a general tendency of farmers to lean toward intuition and less trust towards technology. While these findings agree with studies such as Lei, et al. [93] and Akrong, et al. [94], they disagree with the results of other studies. Joffre, et al. [95] for instance discovered that farmer clusters in Vietnam had increased adoption of technology and improved practices. In the same vein, Ramírez Gómez, et al. [96] found that farmers adopted existing, available technologies, albeit at different levels. These differences can be attributed to a number of reasons. First, a farmers' trust in the technology may be influenced by their perception of potential risks from using a particular technology, the availability of government funding and regulatory frameworks, as well as their confidence in technology promoted by government and other stakeholders [97]. The existing social relationships and multiple networks of farmers, together with their trust in social networks, can also affect their trust in and subsequent utilization of technology [84]. Still, lack of farmers' trust in government collaboration and policies, as well as matters relating to the ownership of data, transparency, and governance in general, can further erode their trust in technology [83]. Additionally, challenges with access to markets, inadequate financing options, and irrelevant policy frameworks may constrain farmers from trusting and utilizing technologies [98].

Furthermore, farmers' perception of how useful a technology is in addition to their perceived ease of its usage is vital to strengthening their trust in technology and formal information sources. When farmers perceive a technology as beneficial and easy-to-use, they tend to have much confidence in it [97]. An additional factor is the farmers' perception of the source of the technology and confidence that the technology providers have their best interests at heart [99]. Again, when farmers are exposed to formal personal information sources, such as farmer groups, their view of the worth of technologies and their intention to utilize them are heightened [99]. Also, when farmers observe that ICTs are simple and user-friendly their trust in the technologies is increased along with their motivation to implement them [100].

Finally, the strength of farmers' social networks is significant in increasing their trust in technology and formal information sources. Social networks facilitate the exchange and transfer of information, experiences, and knowledge among farmers [88]. Through these networks, farmers become aware of mature experiences, best practices from their peers, agricultural technology information, and high-quality technologies [85]. When the trust within farmer networks is high, the trust of individual farmers in the technologies and innovations that are diffused in the networks is heightened [101]. When information about technologies is shared through social networks with the involvement of trusted sources, such as extension officers and opinion leaders, farmers' trust in technology and willingness to use formal information sources is greatly improved [85,90].

### 4.3. Limitations

There are a few limitations that may affect the generalizability of the findings in this study. One of the limitations of our studies is the limited population of respondents in a global sample from two sectors. Thus, the generalizations of this study's results are limited since it is not necessarily representative of the population of the sectors.

A second limitation of the current research is the possibility of common method variance. All the data were collected using a single survey instrument. Future studies could collect data through a longitudinal or time-series studies which would enable the effects of different thinking styles to be analyzed over time. A further interesting question that remains to be solved is, how can we trigger people to use the combination of intuition and deliberation, for people to make prudent decisions?

Self-report, which is based on subjective experience, is a third flaw of this investigation. Nosek, et al. [102] caution that the incentive to report, respondents' limitations in introspective abilities, and ability to transform mental material into a report can all impact introspectively generated metrics (like surveys). As a result, for future studies experimental designs can be used to investigate factors affecting the attitudes and actions of managers [39].

## 5. Conclusion

This study has several important practical and managerial implications. First, this research makes an important contribution to understanding decision-making in the two professions across the globe. The theoretical and practical ramifications of the discoveries may be substantial.

Theoretically, this study's findings shed light on how individual characteristics affect farmers' decision-making and their subsequent adoption of new technology. This deepens our understanding of the connection between decision-making style and three different contexts of trust in working environments. The distinct behavioral preference is clear for both the farming and banking professions.

A key area emerging from the current results is that of behavioral farming, which has shown promise in explaining the actions of specific subsets of farmers and, in particular, what motivates them to embrace sustainable farming practices [103]. This study demonstrates that particular personal preferences are connected with perceptions and judgments concerning technologies and use of information systems. To improve the current state of the field it could be helpful for both designers, programmers and agricultural extension educators to account for people's decisional preferences. We recommend this to enable the modulation of differentiated human–computer interactions, depending on the individual user characteristics, allowing both to better serve the common good.

Any human organization benefits from improved insight into decisional preferences prior to the development of management groups from different professions, e.g., to ensure the correct adaptation and alignment of the leadership and management practices of the professional sector. Researchers, practitioners, and managers can benefit from this study as it provides more empirical results regarding the decision-making style of working adults in agriculture and banking.

Information system planners may find it challenging to understand clients' decisions since user behavior frequently deviates from logic and reason [104]. Based on our findings, we recommend that professionals in fields such as agricultural extension administer brief questionnaires to learn more about their clients' personality types and decision-making preferences. Based on our results we assume that technologies and information systems can lead to action possibilities for improvements in decision outcomes, when they are adjusted to user's decision style.

A possible future line of inquiry is cross-cultural behavioral management [105]. We propose three specific directions for future study. First, researchers in different countries need to collect data by observing the interactions of top managers, line and middle managers, and students. Second, similar studies in the future can include a wider range of countries, controlling for global north or global south contexts. Third, given sufficient effort during data collection, the data should be split into similarity groups and analyzed separately, to allow for homogeneous groups for the comparisons, yielding linear analysis results.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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This data used in this manuscript was collected through a non-interventional study, i.e. a survey. Data Protection Commissioner Prof. Dr. Klages, Ostfalia University (Germany) represents the Commission for Research Ethics at Ostfalia University and has checked and approved all actions at the time. The first and the fifth author received funding from the European Fund for Regional Development to carry out this research. All authors declare that they have no financial and/or business interests in a company that may be affected by the research reported in the enclosed paper.

## Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.dajour.2024.100427.

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