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# The relationship between market information and entrepreneurial orientation: the case of smallholder honey producers in Northern Uganda

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## Abstract

**Purpose:** The purpose of this study was to determine the influence of market information on entrepreneurial orientations of smallholder honey producers.

**Design/methodology/approach:** A cross-sectional study design with sample of 250 honey producers was used. Structural equations modeling was used to analyze the hypothesized relationships.

**Findings:** Results show that product quality, trader preferences and consumer preferences are the main market information needs that influence entrepreneurial orientation of honey producers. Further, the attributes of market information quality, i.e., information credibility, timeliness, accuracy and usability positively influence entrepreneurial orientation.

**Practical implications:** Results of this study calls for prioritization of better access to regular, reliable and usable market information for honey producers in development programs and policies so as to enhance farmer entrepreneurial orientations and product development.

**Social implications:** Smallholder honey producers are more likely to efficiently deliver innovative products if development interventions across the public and non-public sector divide become responsive to their marketing information needs as well the quality of market information provided.

**Originality/value:** The study uses original data from honey producers to demonstrate the role that marketing information needs as well as market information quality play in catalyzing smallholder farmer entrepreneurial orientation.

**Keywords:** Information quality, Information needs, Smallholder farmers, Honey production, Entrepreneurial orientation, Market information

## Introduction

Honey production is reportedly an important commercial enterprise for socioeconomic development and overall poverty alleviation (Berem et al. 2010; Kasangaki et al. 2022; Mujuni et al. 2012; Otim et al. 2018). As a socioeconomic product, honey

is highly demanded for household consumption and it is widely used in medicinal and cosmetic products (Dossou et al. 2022; Kasangaki et al. 2022; Mbah 2012). Consequently, honey production has potential to contribute to food security and employment creation among smallholder producers (Sialuk 2014; Yadeta 2015). However, the potential of honey production has not been fully exploited in most developing countries such as Uganda, a fact attributed to marketing challenges (Dossou et al. 2022). Key marketing challenges include high transaction costs, inferior quality products, unreliable supplies and a general lack of marketing information (Kalanzi et al. 2018; Kumsa and Takele 2014; Masuku 2013). As such, smallholder honey producers persistently face marketing difficulties in spite of the existence of extensive market opportunities for honey (Kalanzi et al. 2015). These marketing constraints are related to finding appropriate buyers, processing technologies and product differentiation.

Market information is an important tool that allows producers to identify and meet customer demands (Ajewole and Fasoro 2013). Access to timely and up-to-date market information therefore enable producers to make informed decisions regarding what, when, how and how much to produce (Keh et al. 2007). Besides its basic economic role, market information also allow producers to decide on which market to sell, what prices to charge, when to sell and how to package and distribute their products (Engotoit et al. 2016). Lack of relevant and timely market information negatively affects the performance of a farmer (Benard et al. 2014; Seenuankaew and Vongprasert 2015). A farmer therefore requires a comprehensive information related to buyer needs in order to effectively market their product or services (Ajewole and Fasoro 2013).

Previous research suggests the critical role of market information in stimulating farmers' entrepreneurial orientation. For instance, Keh et al. (2007) found that market information was as a mediator between entrepreneurial orientation and firm performance; and Keh et al. (2007) concluded that market information is an important factor in stimulating entrepreneurial orientation. As part of scanning and monitoring the operating environment, firms search for information that enables them to better meet their customer needs, create customer value, manage their risks, innovate, identify new marketing opportunities, as well as manage market competition. Whereas commercial firms typically have the potential to constantly search for market information, smallholder farmers, especially in sub-Saharan Africa (SSA), usually lack such capacity. Particularly, smallholder farmer may fail to access quality information on market-desired product attributes. This has the possibility of negatively influencing their entrepreneurial orientation (Mugonya et al. 2021). Consequently, commercialization of honey production is likely to depend on smallholder farmer access to quality market information.

Existing research on entrepreneurial orientation (EO) emphasizes the practice of innovativeness, proactiveness and risk taking as critical dimensions for strategic market-oriented decisions (Tirfe 2014; Konte et al. 2019). Although research has been done on different aspects of smallholder honey production such as honey value chain (Ndyomugenyi et al. 2015; Kilimo-Trust 2012); technology adoption (Bukonya 2018; Otim et al. 2018; Kalanzi et al. 2015; Amulen et al. 2017a); and honey quality (Amulen et al. 2017b; Kugonza and Nabakabya 2008), limited studies exists on the influence of market information on entrepreneurial orientation. Understanding the role of market

information need and the quality of market information farmers receive is critical if smallholder farmers are to profitably enter new or existing markets.

This paper assesses the role of response to farmer market information needs and information quality in fostering entrepreneurial orientation of smallholder honey producers. The subsequent sections of this paper are organized as follows: The next section presents the conceptual framework and the associated hypotheses, followed by the study methodology, presentation of results, discussions and conclusions arising from the study. Finally, recommendation and limitations are discussed and suggestions for future research are given.

## **Theoretical framework and hypotheses development**

### **Entrepreneurial orientation**

Following Lumpkin and Dess (2001), entrepreneurial orientation (EO) is defined as farmer practices, processes, behavior and decisions that lead to entry into new or established markets with new or existing products. In this study, EO is conceptualized in three core dimensions, namely innovativeness, proactiveness and risk taking. Innovativeness involves farmers' tendency to engage in creative processes and searching of new ideas or methods of bringing new products to current or new markets (Lumpkin and Dess 2001; Prince et al. 2021; Wójcik-Karpacz et al. 2022). Proactiveness reflects farmer's tendency to seek for new market opportunities for the products ahead of competition and acting in anticipation of future demands which may or may not be related to the present line of operations (Langkamp and Lane 2012; Rauch et al. 2009). Risk taking refers to farmers' willingness to commit significant resources to product marketing opportunities in the face of uncertainty (Langkamp and Lane 2012; Rauch et al. 2009). These three dimensions are the most commonly used in assessing farmers' entrepreneurial orientation (Konté et al. 2019; Tirfe 2014).

### **Market information needs**

Market information needs refers to the outcome of market research by farmers in planning for future marketing or product development initiatives. According to Keh et al. (2007), a market information need is likely to be related to entrepreneurial orientation. However, empirical results in the context of honey producers are generally lacking. It is assumed that farmers who receive the right market information might make better decisions in improving the quality of their products and thus have better entrepreneurial orientation. For instance, Seenuankaew et al. (2018) and Sanova et al. (2017) suggested that availing information on product quality may increase farmers' ability to invest resources to upgrade product quality as a strategy of influencing buyer decisions to purchase a product.

Therefore, the study hypothesized that

**H<sub>1</sub>** Market information needs on product quality positively influence entrepreneurial orientation.

**H1a** Market information on product quality is positively related to farmer innovativeness.

**H1b** Market information on product quality is positively related to farmer proactiveness.

**H1c** Market information on product quality is positively related to farmer risk taking.

Consumer preferences as a construct is considered a fundamental factor that may influence farmers' entrepreneurial orientation. According to Vora et al. (2012), Brscic et al. (2017) and Tarekegn et al. (2017), information on consumer preferences for a particular product determines producers ability and decision to direct resources to develop the product and seek for new market for it. According to Omar et al. (2010), if market information needs of the farmers are met, the quality of decision they make tends to improve. Raghunathan (1999) further added that when farmers find that such market information useful, they tend to use it to make effective production and marketing decisions, which consequently may increase their level of entrepreneurial orientation.

Based on these, the study hypothesized that:

**H<sub>2</sub>** Market information needs on consumer preferences positively influence entrepreneurial orientation.

**H2a** Market information on consumer preferences is positively related to farmer innovativeness

**H2b** Market information on consumer preferences is positively related to farmer proactiveness

**H2c** Market information on consumer preferences is positively related to farmer risk taking

According to Vora et al. (2012), market information on trader preferences improves farmers risk taking ability, which ultimately improves innovativeness by being able to constantly produce and supply the right quality product that meet customer needs (Lumpkin and Dess 2001; Keh et al. 2007). Seenuankaew et al. (2018) further add that such market information enables farmers to be proactive by searching for new or better market to increase marketing of their product. Grounded on these, it is therefore hypothesized that:

**H<sub>3</sub>** Market information needs on trader preference positively influence entrepreneurial orientation.

**H3a** Market information on trader preference is positively related to farmer innovativeness

**H3b** Market information on trader preference is positively related to farmer proactiveness

**H3c** Market information on trader preference is positively related to farmer risk taking

### Market information quality

Market information quality refers to the level at which the farmers use market information to market their products. Previous research has suggested that a relationship exists between market information quality and farmers' entrepreneurial orientation (Keh et al. 2007). Therefore, the quality of market information a farmer receives on market-desired product helps the farmer to make market-oriented decision and take the advantage of emerging business opportunities, which ultimately has a positive influence on farmers' entrepreneurial orientation. Additionally, farmers with high levels of entrepreneurial orientation are likely to be active in acquiring right market information on market-desired product to enhance their marketing decisions. Market information quality is studied as information timeliness, accuracy, credibility and usability.

Timeliness of market information on customer-desired product increases farmer's competences or ability to make the right decision to innovate on products to produce and marketing processes, explore new marketing opportunities for the product, and take business risk through allocating more resources into production and marketing activities in order to increase sales (Omar et al. 2010). Ajewole and Fasoro (2013) pointed out that timely access to information on prices and quantities lessened the risk of money loss during market transaction. As such, the study hypothesized that:

**H<sub>4</sub>** Market information timeliness positively influences entrepreneurial orientation.

**H4a.** Market information timeliness is positively related to farmer innovativeness.

**H4b.** Market information timeliness is positively related to farmer proactiveness.

**H4c.** Market information timeliness is positively related to farmer risk taking.

On the other hand, Omar et al. (2010) pointed out that accuracy of information is very important in influencing farmers marketing decision and should not be compromised as it enhance farmer's entrepreneurial orientation. Therefore, if the information communicated is inaccurate or incorrect, it may lose its value and hence affect farmer's marketing decision as well as their entrepreneurial ability negatively (Omar et al. 2010). Accordingly, Raghunathan (1999) noted that information must have its usefulness to the farmers in order to facilitate them to make effective marketing decision which ultimately improves their level of innovativeness, proactiveness and risk taking. Based on this literature, the study postulate that:

**H<sub>5</sub>** Market information accuracy positively influences entrepreneurial orientation.

**H5a** Market information accuracy is positively related to farmer innovativeness.

**H5b** Market information accuracy is positively related to farmer proactiveness.

**H5c** Market information accuracy is positively related to farmer risk taking.

Llewellyn (2007) suggested that farmers that use credible information in their farming system tend to enriched their decision-making, minimized information seeking and learning or interpretation costs, which in turn improves their entrepreneurial

orientation. For this reason, smallholder farmers need to seek trustworthy information on customers and their preferences and utilize such information to make good decisions to produce new product, seek for new market opportunities for their product and take business risk by committing significant number of resources in production and marketing process in order to increase marketing.

As a result, the study postulates that:

**H<sub>6</sub>** Market information credibility positively influences entrepreneurial orientation.

**H6a** Credibility of market information is positively related to farmer innovativeness.

**H6b** Credibility of market information is positively related to farmer proactiveness.

**H6c** Credibility of market information is positively related to farmer risk taking.

Market information usability is measured as the degree to which a farmer directly applies market information to influence marketing-related decisions (Deshpande and Zaltman 1982; Keh et al. 2007; Menon and Varadarajan 1992). Therefore, market information usability is particularly considered significant to farmer's final marketing decisions on good use (Ottum and Moore 1997; Wilton and Myers 1986). Menon and Varadarajan (1992) considered information usability to be an action-oriented use which results in changes in the user's activities and practices. Subsequently, Diamantopoulos and Souchon (1999) and Keh et al. (2007) suggested that if information obtained by entrepreneurs or farmers are put in to good use, it influences farmer entrepreneurial orientation through making strategic market-oriented decisions. Numerous studies suggest the central role of market information usability (Keh et al. 2007; Miller and Friesen 1982; Moorman 1995; Ottum and Moore 1997; Wilton and Myers 1986).

As such, the study posits that:

**H<sub>7</sub>** Market information usability positively influences entrepreneurial orientation.

**H7a** Market information usability is positively related to farmer innovativeness.

**H7b** Market information usability is positively related to farmer proactiveness.

**H7c** Market information usability is positively related to farmer risk taking.

## Methods

### Study context

Primary data for this study were collected between January and February 2020. The study focused on smallholder honey producers, defined as farmers having between 1 and 50 beehives (Lee et al. 2015). The study area was Lira District in northern Uganda. Northern Uganda is the leading honey producer in the country with mean annual honey yields of 640 MT per year and Lira in particular being the district with the highest number of value chain actors in the region (Kilimo-Trust 2012). Data were collected from three sub-counties of Ogur, Ngetta and Agali, Lira District, which are leading honey production areas in Lira District.

Majority (84%) of the smallholder honey producers were males, with an average age of 45 years old. A typical honey-producing household averaged 6 members, owned 5 acres of land, had 9 years of experience in honey production, owned 12 hives and harvested 72 kg of honey per season. Few (38%) honey producers had access to extension services, majorly from non-governmental organizations (NGOs) who mainly provided information on hive management (Table 1).

### Sampling design

A multistage sampling design was followed in selecting the study respondents for this study. Lira District was purposively selected due to the high concentration of smallholder

**Table 1** Characteristics of smallholder honey producers

| Characteristic(s)                   | Mean (n = 250) | Minimum | Maximum |
|-------------------------------------|----------------|---------|---------|
| Age (years)                         | 45.0           | 15.0    | 90.0    |
| Educational level (years)           | 8.0            | 0.0     | 19.0    |
| Household size                      | 6.0            | 0.0     | 16.0    |
| Farm size (acres)                   | 5.0            | 1.0     | 40.0    |
| Land allocated to honey production  | 0.4            | 0.3     | 2.0     |
| Honey production experience         | 9.0            | 1.0     | 71.0    |
| Number of extension visit           | 1.0            | 0.0     | 15.0    |
| Hive in apiary                      | 12.0           | 1.0     | 50.0    |
| Colonized hive                      | 10.0           | 1.0     | 50.0    |
| Kilogram harvested per hive         | 8.0            | 1.0     | 25.0    |
| Kilogram harvested per producer     | 71.8           | 5.0     | 1100    |
| Price per kilogram of honey (UGX)   | 7370           | 1700    | 15,000  |
| Distance to the nearest market (km) | 5.0            | 0.3     | 25.0    |

  

| Characteristic(s)             | Description(s)       | Percentage (n = 250) |
|-------------------------------|----------------------|----------------------|
| Gender                        | Male                 | 84.0                 |
| Extension visit               | Access               | 38.0                 |
| Type of extension agent       | Government           | 7.0                  |
|                               | NGO                  | 34.0                 |
|                               | Farmer association   | 1.0                  |
| Purpose of extension visit    | Hive management      | 36.0                 |
|                               | Honey marketing      | 26.0                 |
|                               | Postharvest handling | 34.0                 |
| Sources of market information | Radio                | 20.0                 |
|                               | Fellow farmers       | 48.0                 |
|                               | Traders              | 66.0                 |
|                               | Cell phone           | 27.0                 |
|                               | Village leaders      | 0.4                  |
|                               | Brochures            | 0.4                  |
|                               | New paper            | 0.8                  |
|                               | Honey buyer          | Farmers association  |
| Honey buyer                   | Wholesale trader     | 45.0                 |
|                               | Retail trader        | 28.0                 |
|                               | Village consumers    | 88.0                 |
|                               | Supermarket          | 2.0                  |
|                               | Others (hospitals)   | 31.0                 |

honey producers. From the district, three sub-counties of Ogur, Ngetta and Agali were purposively as they host majority of honey producers. From each sub-county, six parishes were purposively selected to participate in the study. From each parish, a list of all honey producers was generated in consultation with chairperson beekeepers' association and local leaders to establish a sampling frame. Systematic random sampling was used to identify the final respondents using the interval of two farmers from the list of smallholder honey producers. To ensure representativeness, parishes with higher numbers was given a higher sample size compared to the ones with smaller number of honey producers.

### Data collection

The survey questionnaire was structured in four sections. The first section captured data on the socioeconomic characteristics of smallholder honey producers, such as gender, age and education level. The second section captured data on entrepreneurial orientation using 10 statements depicting the three entrepreneurial orientation constructs, namely innovativeness, proactiveness and risk taking. The third section examined the market information needs of smallholder honey producers using 10 statements representing the three constructs of information needs, i.e., product quality, consumer preference and trader preference. The fourth section examined the market information quality using 19 statements representing four market information quality constructs of timeliness, accuracy, credibility and usability. All constructs were measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

### Data analysis

Data were analyzed using SPSS version 21 and AMOS 23. Since the constructs were being applied in a different context from which they have been developed and tested, exploratory factor analysis (EFA) with principal component analysis (PCA) was first conducted without specifying the number of factors. Varimax rotation with Kaiser normalization was then used to clarify on the number of factors (Janssens et al. 2008). Following Janssens et al. (2008), items with cross-loadings and/or low loadings on the respective factors were dropped from the model. Cronbach alpha was then calculated for each factor extracted to assess the internal consistency of the extracted components (Janssens et al. 2008).

For the constructs of entrepreneurial orientation, all the three dimensions, namely innovativeness, proactiveness and risk taking were extracted, explaining 75% of the variations in entrepreneurial orientation (Table 2). The results of Kaiser–Meyer–Olkin (KMO) were 0.85 which was above the minimum acceptable threshold of 0.7. Further, Bartlett's sphericity test ( $\chi^2 = 1825.50$ ,  $df = 45$  and  $P < 0.01$ ) indicated sampling adequacy and suitability of the data set for SEM. The Cronbach alpha tests of internal reliability were above the minimum threshold of 0.6 (Gao et al. 2011; Odongo et al. 2016), suggesting adequate consistency of the measured constructs.

For market information needs, EFA yielded three components, namely product quality, consumer preferences and trader preferences, explaining 73% variation in market information needs (Table 3). The fit indices of KMO (0.77) were above the minimum threshold of 0.7 and Bartlett and sphericity test was statistically significant ( $\chi^2 = 1538.93$ ,



**Table 2** Exploratory factor analysis for entrepreneurial orientation

|  | Standardized factor loadings |              |              |
|--|------------------------------|--------------|--------------|
|  | F1 (PA)                      | F2 (RT)      | F3 (IN)      |
| Items  |                              |              |              |
| I don't always try to learn the best practices of other honey producers to stay competitive on the market <sup>®</sup> | 0.936                        |              |              |
| I don't always try to avoid overt competition in honey business <sup>®</sup>   | 0.923                        |              |              |
| I always introduce practices for quality control for honey to remains attractive to buyers                             | 0.913                        |              |              |
| I always try to learn preferences of buyers to improve honey business  | 0.883                        |              |              |
| Cronbach alpha   | <b>0.967</b>                 |              |              |
| I always have a tendency of trying to compete with producers in packaging honey for the market                         |                              | 0.808        |              |
| I always explore new packaging design for honey to remain attractive to buyer  |                              | 0.804        |              |
| I always explore for new lucrative markets for my honey  |                              | 0.712        |              |
| I always fear about incurring losses in the honey business <sup>®</sup>  |                              | 0.513        |              |
| Cronbach alpha   |                              | <b>0.729</b> |              |
| I always search for new practices for improving honey marketing  |                              |              | 0.817        |
| I don't always implement practices for improving the quality of honey <sup>®</sup>                                     |                              |              | 0.811        |
| Cronbach alpha   |                              |              | <b>0.640</b> |
| Percentage variance explained  | <b>35.5%</b>                 | <b>23.3%</b> | <b>15.7%</b> |

The bold figures are for the cronbach Alpha values of the major Factor loadings

Total variance explained = 74.5%. F1 = items of proactiveness (PA), F1 = items of risk taking (RT), F3 = items of innovativeness (IN)

**Table 3** Exploratory factor analysis for market information needs

|                               | Standardized factor loadings |              |              |
|-------------------------------|------------------------------|--------------|--------------|
|                               | F1 (TP)                      | F2 (CP)      | F3 (PQL)     |
| Items                         |                              |              |              |
| Timely delivery of honey      | 0.884                        |              |              |
| Pack size of honey            | 0.882                        |              |              |
| Packaging container of honey  | 0.866                        |              |              |
| Price of honey                | 0.859                        |              |              |
| Cronbach alpha                | <b>0.901</b>                 |              |              |
| Packaging container of honey  |                              | 0.900        |              |
| Timely delivery of honey      |                              | 0.855        |              |
| Pack size of honey            |                              | 0.855        |              |
| Price of honey                |                              | 0.823        |              |
| Cronbach alpha                |                              | <b>0.873</b> |              |
| Sweetness of honey            |                              |              | 0.833        |
| Cleanliness of honey          |                              |              | 0.753        |
| Thickness of honey            |                              |              | 0.706        |
| Cronbach alpha                |                              |              | <b>0.600</b> |
| Percentage variance explained | <b>28.7%</b>                 | <b>28.0%</b> | <b>16.4%</b> |

The bold figures are for the cronbach Alpha values of the major Factor loading

Total variance explained = 73.0%. F1 = items of trader preference (TP), F2 = items of consumer preference (CP), F3 = items of product quality (PQL)

$df=55$  and  $P<0.01$ ). Cronbach's alpha values were above the minimum threshold of ( $\geq 0.6$ ) confirming adherence to the assumption of internal consistency (Table 3).

For market information quality, four factors, namely timeliness, accuracy, credibility and usability, explaining about 80 percent variation in market information quality were extracted (Table 4). The EFA results reveal that sampling adequate was met, i.e.,  $KMO=0.85$ , and Bartlett and sphericity test was statistically significant ( $\chi^2=4815.47$ ,  $df=171$  and  $P<0.01$ ). Further, all factor loadings were above 0.5. Cronbach's alpha values were ranging between 0.915 and 0.945 which were above the threshold, and thus, assumption of measurement (composite) reliability was confirmed (Gao et al. 2011; Odongo et al. 2016).

**Table 4** Exploratory factor analysis results for market information quality

|   | Standardized factor loadings |              |              |              |
|---|------------------------------|--------------|--------------|--------------|
|   | F1 (CR)                      | F2 (AC)      | F3 (US)      | F4 (TL)      |
| Items   |                              |              |              |              |
| I received trust worthy information on honey packaging container preference of buyers                   | 0.936                        |              |              |              |
| I don't receive trust worthy information on honey buyer <sup>®</sup>                                    | 0.935                        |              |              |              |
| I do not receive trust worthy information on product pack size preference of buyers <sup>®</sup>        | 0.897                        |              |              |              |
| The information I received on places of honey delivery is trust worthy                                  | 0.860                        |              |              |              |
| The information I received on honey quality preferences of buyers is trust worthy                       | 0.856                        |              |              |              |
| The information I received on market prices of honey is not trust worthy <sup>®</sup>                   | 0.786                        |              |              |              |
| Cronbach alpha  | <b>0.945</b>                 |              |              |              |
| I don't always receive correct information on market prices of honey <sup>®</sup>                       |                              | 0.952        |              |              |
| The information I received on places of honey delivery is always correct                                |                              | 0.940        |              |              |
| I don't receive correct information on honey buyer <sup>®</sup>   |                              | 0.901        |              |              |
| The information I received on honey quality preferences of buyers is always correct                     |                              | 0.886        |              |              |
| I do not receive correct information on product pack size preference of buyers <sup>®</sup>             |                              | 0.773        |              |              |
| I received correct information on honey packaging container preference of buyers                        |                              | 0.712        |              |              |
| Cronbach alpha  |                              | <b>0.931</b> |              |              |
| The information I received on market prices of honey is not used in marketing honey <sup>®</sup>        |                              |              | 0.925        |              |
| The information I received on honey packaging container preference of buyers is used in marketing honey |                              |              | 0.905        |              |
| I do not use information on product pack size preference of buyers to market honey <sup>®</sup>         |                              |              | 0.895        |              |
| I use information on honey quality preferences of buyers to market honey                                |                              |              | 0.852        |              |
| Cronbach alpha  |                              |              | <b>0.917</b> |              |
| I received information on honey quality preferences of buyers on time                                   |                              |              |              | 0.931        |
| I received information on places of honey delivery on time  |                              |              |              | 0.915        |
| I don't received information on market prices of honey on time <sup>®</sup>                             |                              |              |              | 0.905        |
| Cronbach alpha  |                              |              |              | <b>0.915</b> |
| Percentage variance explained   | <b>25.1%</b>                 | <b>24.2%</b> | <b>17.0%</b> | <b>13.8%</b> |

The bold figures are for the cronbach Alpha values of the major Factor loadings

Total variance explained = 80.1%, F1 = items of credibility (CR), F2 = items of accuracy (AC), F3 = items of usability (US), F4 = items of timeliness (TL)

### Confirmatory factor analysis

The second stage of analysis involved confirmatory factor analysis (CFA) using (AMOS). This stage involved estimating the standardized path estimates so as to examine the cause–effect relationships among the constructs using structural equations modeling (SEM) (Byrne Barbara 2016; Mittal and Dhar 2015). Following Anderson and Gerbing(1988), a two-step approach with SEM in testing a measurement and structural model was used. A measurement model was estimated based on the three dimensions of entrepreneurial orientation, three market information needs and four market information quality constructs extracted. A structural model was generated based on the measurement model using the maximum likelihood method to determine the strength of the hypothesized relationship between the latent variables. The structural model was modified by covarying the measurement error terms on one items of trader preference, three items of credibility, two items of usability and proactiveness, and covarying the three residual error terms on innovativeness, proactiveness and risk taking, respectively. Further, the three predictors of market information needs and four predictors of market information quality were also allowed to covary. The fit indices for the modified model of market information ( $X^2=253.77$ ,  $P$  value=0.0001, GFI=0.91, CFI=0.96 and RMSEA=0.06) and market information quality ( $X^2=387.08$ ,  $P$  value=0.0001, GFI=0.90, CFI=0.96 and RMSEA=0.06) were all within acceptable limits for a CFA (Hooper et al. 1993; Hu and Bentler 1999; Janssens et al. 2008; Mun et al. 2006).

## Results and discussions

### Effect of market information needs on entrepreneurial orientation

Results of SEM revealed seven significant paths, with market information on product quality positively influencing innovativeness and proactiveness, and so supporting hypothesis  $H_{1a}$  and  $H_{1b}$ . Similarly, market information on consumer preferences positively influences proactiveness and risk taking (supporting  $H_{2b}$ ,  $H_{2c}$ ), while market information on trader preferences positively influences innovativeness, proactiveness and risk taking [support for  $H_{3a}$ ,  $H_{3b}$ ,  $H_{3c}$ ] (Table 5).

**Table 5** Influence of market information needs on entrepreneurial orientation

| Hypothesis | Regression path      | Path coefficients<br>Estimate, $\beta$ (S.E) | t value  | Results       |
|------------|----------------------|--|----------|---------------|
| H1a        | PQL $\rightarrow$ IN | 0.242 (0.203)                                | 2.392**  | Supported     |
| H1b        | PQL $\rightarrow$ PA | 0.293 (0.308)                                | 3.507*** | Supported     |
| H1c        | PQL $\rightarrow$ RT | 0.127 (0.186)                                | 1.372    | Not supported |
| H2a        | CP $\rightarrow$ IN  | 0.170 (0.052)                                | 1.827    | Not supported |
| H2b        | CP $\rightarrow$ PA  | 0.155 (0.073)                                | 2.170**  | Supported     |
| H2c        | CP $\rightarrow$ RT  | 0.172 (0.048)                                | 2.017**  | Supported     |
| H3a        | TP $\rightarrow$ IN  | 0.365 (0.038)                                | 3.735*** | Supported     |
| H3b        | TP $\rightarrow$ PA  | 0.258 (0.051)                                | 3.619*** | Supported     |
| H3c        | TP $\rightarrow$ RT  | 0.359 (0.037)                                | 3.736*** | Supported     |

PQL product quality, CP consumer preference, TP trader preference, IN innovativeness, PA proactiveness, RT risk taking

\*\*\* Significant at 0.01

\*\* Significant at 0.05

These results underscore the significance of market information need in marketing of honey among smallholder honey producers. Particularly, the important role of product quality demands, consumer preferences for different quality attributes as well as trader preference is underscored here. Access to market information on honey quality attributes such as cleanliness and flavor enables farmers to make the necessary investments in their hives, harvesting, process and packaging to meet the market demands. As such, honey producers will have to innovate to meet these market demands, hence becoming more entrepreneurial. As honey consumers become increasingly quality cautious, producers will need to effectively reposition themselves in the market in order to remain competitive. This might involve sustained response to consumer quality needs by producing the right or novelty quality products. Studies by Seenuankaew et al. (2018) observed that rice farmers used market information on product quality to upgrade the quality of their rice products to meet the market standards; and Sanova et al. (2017) who found that consumers quality demands informed producers decision to develop novelty quality product that meets buyers expectations provide support to this findings. Further, previous authors such as Tarekegn et al. (2017), Brscic et al. (2017), Mkenda et al. (2017), Naveed and Hassan (2021) and Bruns et al. (2022) allude to the important role of market information on consumer quality demands in information producers' marketing decisions. Additionally, Vora et al. (2012) reported that knowledge of consumer preferences increases risk taking ability for one to meet such needs.

Looking at the honey value chain, producers usually sell their products to wholesalers or retailers, who ultimately sell to the final consumers. Trader preferences for honey products are often influenced by what the final consumers wants, and this is often passed down to the producer through traders stated preferences. As such, knowledge on the different trader preferences for quantity, packaging and quality may prompt producers to innovate. The ability to innovate may further be enhanced when producers get to know of traders who offer premium prices for better quality products. A similar study by Keh et al. (2007) revealed that firms that accessed market information on trader preference tend to be creative in their production to consistently supply the right product that meet these needs and compete effectively in the market. Further, information on trader preference probably increases producers' confidence and risk taking ability. This is because producers are inspired to take courage and invest more resources into production and marketing process to be able explore more lucrative market opportunities for their honey products.

The results in the current study support in the literature on market information. For instance, Seenuankaew et al. (2018) observed that farmers require market information on trader preferences to develop products and search for new better market to increase marketing of their product, Lumpkin and Dess (2001) revealed that farmers that anticipate trader needs tend to respond to them by providing the right product and services, and Vora et al. (2012) and Keh et al. (2007) reported improved risk taking ability with knowledge of trader preferences to improve their competitiveness.

#### **Effect of market information quality on entrepreneurial orientation**

For market information quality, eight significant paths, with market information timeliness positively influencing risk taking (supporting hypothesis  $H_{4c}$ ); market information

accuracy positively influencing proactiveness and risk taking (supporting  $H_{5b}$ ,  $H_{5c}$ ); market information credibility positively influencing innovativeness, proactiveness and risk taking (supporting  $H_{6a}$ ,  $H_{6b}$ ,  $H_{6c}$ ); and market information usability positively influencing innovativeness and risk taking (supporting for  $H_{7a}$ ,  $H_{7c}$ ), were observed (Table 6).

These findings underscore the critical role of the three dimensions of market information quality, i.e., accuracy, credibility and usability, in stimulating entrepreneurship for smallholder farmers. Accessing timely information on product prices, customers and their preferences may stimulate producers to take business risks and innovate. Such producers may easily solicit for resources in time and will invest them for honey marketing. Timely access to market information informs the producers on where to allocate their resources with less fear of loss (Ajewole and Fasoro 2013). Further, the importance of information accuracy and credibility is underscored as it provides confidence in production process. Accurate and credible information enables producers to exploit new market opportunities and as such improve on their marketing. It gives confidence to honey producers to explore more business opportunities and markets for honey. Accurate and credible market information may further provide smallholder honey producers with ability to improve on the current practices or get involved in creative methods of production and providing services that improve the quality of honey to meet customers' demand in the available market.

These results finds support in the previous literature from studies such as Demeter et al. (2007), Omar et al. (2010) and Phiri et al. (2019), who reported that accuracy of market information generates new market opportunities and improves decision-making in marketing; and Llewellyn (2007) who revealed that producers who apply credible market information are more innovative in the different marketing decisions. This is presumably because producers tend to believe that if the market information is trustworthy, then they are less likely to incur losses. They are sure that they will obtain better returns on investment and will therefore take the necessary risks and allocate more

**Table 6** Influence of market information quality on entrepreneurial orientation

| Hypothesis | Regression path     | Path coefficients<br>Estimate, $\beta$ (S.E) | t value  | Results       |
|------------|---------------------|--|----------|---------------|
| H1a        | TL $\rightarrow$ IN | -0.025 (0.041)                               | -0.299   | Not supported |
| H1b        | TL $\rightarrow$ PA | 0.022 (0.062)                                | 0.340    | Not supported |
| H1c        | TL $\rightarrow$ RT | 0.256 (0.044)                                | 3.234*** | Supported     |
| H2a        | AC $\rightarrow$ IN | -0.021 (0.067)                               | -0.184   | Not supported |
| H2b        | AC $\rightarrow$ PA | 0.281 (0.144)                                | 2.228**  | Supported     |
| H2c        | AC $\rightarrow$ RT | 0.257 (0.077)                                | 2.229**  | Supported     |
| H3a        | CR $\rightarrow$ IN | 0.246 (0.044)                                | 2.678*** | Supported     |
| H3b        | CR $\rightarrow$ PA | 0.176 (0.065)                                | 2.270*** | Supported     |
| H3c        | CR $\rightarrow$ RT | 0.261 (0.045)                                | 3.136*** | Supported     |
| H4a        | US $\rightarrow$ IN | 0.240 (0.026)                                | 2.871*** | Supported     |
| H4b        | US $\rightarrow$ PA | 0.091 (0.039)                                | 1.434    | Not supported |
| H4c        | US $\rightarrow$ RT | 0.232 (0.028)                                | 2.963*** | Supported     |

TL timeliness, AC accuracy, CR credibility, US usability, IN innovativeness, PA proactiveness, RT risk taking

\*\*\* Significant at 0.01

\*\* Significant at 0.05

resources into production and marketing activities based on the credible market information obtained.

Market information is used to enhance production, develop quality, market and improve earning (Byamugisha et al. 2008; Muhanguzi and Ngubiri 2022). Consequently, being timely, accurate and credible may not be enough if the market information received is not usable by the producer. Producers should therefore be able to find market information they receive easily usable and relevant to their context. Keh et al. (2007) reported a positive association between market information usability and producers' innovativeness. Additionally, Byamugisha et al. (2008) and Muhanguzi and Ngubiri (2022) reported that useable market information triggered farmers' ability to produce better quality products and make sound marketing decisions.

### Conclusions

This study sought to examine the role of market information on entrepreneurial orientation of smallholder honey producers. Specifically, the study focused on the influence of market information needs and information quality on entrepreneurial orientation. This study establishes that market information on product quality requirements, consumer preferences and trader preferences are critical predictors of entrepreneurial orientation. Further, information accuracy, credibility and usability were found to be important aspects of market information that influences entrepreneurial orientation. Therefore, it can be concluded that accessing timely, accurate, credible and usable market information on product quality, consumer and trader preferences is important in stimulating entrepreneurial orientation among smallholder honey producers.

Access to the right and timely market information enables producers to manage risk, innovation, identify new marketing opportunities and consistently deliver high-quality products to meet customer's needs. Enhancing smallholder farmer entrepreneurial orientation will therefore entail improving access to accurate, credible and usable market information. Such information should be not only in the quality requirements, but also on consumer and trader preferences of the products.

### Recommendations

For practice, results of this study call for prioritization of regular and reliable market information for honey producers in development programs and policies so as to enhance farmer entrepreneurial orientations and product development. If market information is readily available and usable to honey producers on market requirements, market trends and product prices, then honey producers may be encouraged to creatively innovate products that match consumer preferences. This allows farmers to shift resources to more rewarding uses and minimize wastage while enhancing farm incomes.

For future research, this study did not consider competitive aggressiveness and autonomy as dimensions of entrepreneurial orientation and how they are influenced by both market information needs and quality. These dimensions if taken into consideration in future studies could provide some insights into whether all the five dimensions of entrepreneurial orientation are influenced by market information needs and quality or there are variations. Additionally, this study did not consider the influence of production related factors on entrepreneurial orientation of smallholder honey producers. These

factors if taken into account in future studies could provide some insights into whether they influence entrepreneurial orientation of smallholder honey producers or otherwise.

#### Authors contributions

WA was responsible for research conceptualization, data curation, formal analysis, and writing original draft. SWK was involved in conceptualization, data curation, formal analysis, reviewing and editing the draft. WO contributed to conceptualization, methodology development, writing editing, and correspondence. All authors read and approved the final manuscript for publication.

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#### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

#### Declarations

##### Competing interests

The authors declare they have no competing interest.

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#### References

- Ajewole OI, Fasoro O (2013) Market and marketing information of Bodija plank market in Ibadan metropolis, Ibadan, Oyo State, Nigeria. *Niger J* for 43(1):13–19
- Amulen DR, Haese MD, Ahikiriza E, Agea JG, Frans JJ, de Graaf DC, Smagghe G, Cross P (2017a) The buzz about bees and poverty alleviation: identifying drivers and barriers of beekeeping in sub-Saharan Africa. *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0172820>
- Amulen DE, Spanoghe P, Houbraken M, Tamale A, de Graaf DC, Cross P (2017b) Environmental contaminants of honey-bee products in Uganda detected using LC–MS/MS and GC–ECD, pp 1–14
- Anderson JC, Gerbing DW (1988) Structural equation modeling in practice: a review and recommended two-step approach. *Psychol Bull* 103(3):411–423. <https://doi.org/10.1037/0033-2909.103.3.411>
- Benard R, Dulle F, Ngalapa H (2014) Assessment of information needs of rice farmers in Tanzania; a case study of Kilombero District, Morogoro. *Lib Philos Pract* 1:1–32
- Berem RM, Obare GA, Owuor G (2010) Is value addition in honey a panacea for poverty reduction in the Asal in Africa? Empirical evidence from Baringo District, Kenya

- Brcsic K, Sugar T, Poljuha D (2017) An empirical examination of consumer preferences for honey in Croatia. *Appl Econ* 49(58):5877–5889. <https://doi.org/10.1080/00036846.2017.1352079>
- Bruns S, Mußhoff O, Ströhlein P (2022) Information needs and delivery channels: experimental evidence from Cambodian smallholders. *IFLA J*. <https://doi.org/10.1177/03400352211057148>
- Bukenya R (2018) Socio-economic factors influencing adoption of market oriented bee keeping in Uganda: a case study of Luwero District, (June)
- Byamugisha HM, Ikoja-odongo R, Nasinyama GW, Lwasa S (2008) Information seeking and use among urban farmers in Kampala District, Uganda. *Agric Inf Worldw* 1(3):94–101
- Byrne Barbara M (2016) Structural equation modeling with AMOS basic concepts, applications, and programming. Routledge, Milton Park
- Demeter K, Forslund H, Jonsson P (2007) The impact of forecast information quality on supply chain performance. *Int J Oper Prod Manag* 27(1):90–107. <https://doi.org/10.1108/01443570710714556>
- Deshpande R, Zaltman G (1982) Factors affecting the use of market research information: a path analysis. *J Mark Res* 19(1):14–31
- Diamantopoulos A, Souchon AL (1999) Measuring export information use scale development and validation. *J Bus Res* 46(1):1–14
- Dossou SAR, Adanguidi J, Aoudji AKN, Gbedomon RC (2022) Promotion of beekeeping: insights from an empirical analysis of three honey value chains in Benin. *Nat Resour Forum* 46:39–59
- Engotoit B, Kituyi GM, Moya MB (2016) Influence of performance expectancy on commercial farmers' intention to use mobile-based communication technologies for agricultural market information dissemination in Uganda. *J Syst Inf Technol* 18(4):346–363. <https://doi.org/10.1108/JSIT-06-2016-0037>
- Gao S, Krogstie J, Siau K (2011) Developing an instrument to measure the adoption of mobile services. *Mob Inf Syst* 7(1):45–67. <https://doi.org/10.3233/MIS-2011-0110>
- Hooper D, Coughlan J, Mullen M (1993) Structural equation modelling: guidelines for determining model fit. University Press of America, New York
- Hu L, Bentler PM (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural equation modeling. Struct Equ Model Multidiscip J* 6(1):1–55. <https://doi.org/10.1080/10705519909540118>
- Janssens W, Wijnen K, De Pelsmacker P, Van Kenhove P (2008) Marketing research with SPSS. Routledge, Milton Park
- Kalanzi F, Nansereko S, Buyinza J, Kiwuso P, Turinayo Y, Mwanja C, Niyibizi G, Ongerep S, Sekatuba J, Mujuni D (2015) Socio-economic analysis of beekeeping enterprise in communities adjacent to Kalinzu forest, Western Uganda. *Int J Res Land Use Sustain* 2(2):81–90. <https://doi.org/10.13140/RG.2.1.2647.4329>
- Kalanzi F, Nansereko S, Buyinza J, Kiwuso P, Turinayo Y, Mwanja C, Niyibizi G, Ongerep S, Sekatuba J, Mujuni D (2018) Socio-economic analysis of beekeeping enterprise in communities adjacent to Kalinzu forest, Western Uganda. *Int J Res Land Use Sustain* 2(1):81–90. <https://doi.org/10.13140/RG.2.1.2647.4329>
- Kasangaki P, Sarah Otim A, P'Odyek Abila P, Angiro C, Chemurot M, Kajobe R (2022) The presence of varroa in Uganda and knowledge about it by the beekeeping industry. *J Agric Res* 54(4):373–377
- Keh HT, Nguyen TTM, Ng HP (2007) The effects of entrepreneurial orientation and marketing information on the performance of SMEs. *J Bus Ventur* 22(4):592–611. <https://doi.org/10.1016/j.jbusvent.2006.05.003>
- Kilimo-Trust (2012) Development of inclusive markets in agriculture and trade (DIMAT). The nature and markets of honey value chains in Uganda
- Konté MS, Ayuya OI, Gathungu E (2019) Effect of entrepreneurial behaviour on farm performance among small-scale farmers: case of Niono Zone, Mali. *Adv Agric Sci* 7(01):24–39
- Kugonza DR, Nabakabya D (2008) Honey quality as affected by handling, processing and marketing channels in Uganda. *Tropicicultura* 26(2):113–118
- Kumsa T, Takele D (2014) Assessment of the effect of seasonal honeybee management on honey production of Ethiopian honeybee (*Apis mellifera*) in modern beekeeping in Jimma Zone. *Res J Agric Environ Manag* 3(5):246–254
- Langkamp DB, Lane MD (2012) Individual entrepreneurial orientation: development of a measurement instrument. *Educ Train* 54(23):219–233. <https://doi.org/10.1108/00400911211210314>
- Lee KV, Steinhauer N, Rennich K, Wilson ME, Tarpy DR, Caron DM, Rose R, Delaplaine KS, Baylis K, Lengerich EJ, Pettis J, Skinner JA, Wilkes JT, Sagili R (2015) A national survey of managed honey bee 2013–2014 annual colony losses in the USA. *Apidologie* 46(3):292–305. <https://doi.org/10.1007/s13592-015-0356-z>
- Llewellyn RS (2007) Information quality and effectiveness for more rapid adoption decisions by farmers. *Field Crops Res* 104(1–3):148–156. <https://doi.org/10.1016/j.fcr.2007.03.022>
- Lumpkin GT, Dess GG (2001) Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role of environment and industry life cycle. *J Bus Ventur* 9026(5):429–451
- Masuku MB (2013) Socioeconomic analysis of beekeeping in Swaziland: a case study of the Manzini Region, Swaziland. *J Dev Agric Econ* 5(6):236–241. <https://doi.org/10.5897/JDAE2013.002>
- Mbah SO (2012) Profitability of honey production enterprise in Umuahia agricultural zone of Abia state, Nigeria. *Int J Agric Rural Dev* 15(3):1268–1274
- Menon A, Varadarajan PR (1992) A model of marketing knowledge use within firms. *J Mark* 56(4):53–71
- Miller D, Friesen PH (1982) Innovation in conservative and entrepreneurial firms two models of strategic momentum. *Strateg Manag J* 3(1):1–25
- Mittal S, Dhar RL (2015) Transformational leadership and employee creativity. Mediating role of creative self-efficacy and moderating role of knowledge sharing. *Manag Decis* 53(5):894–910. <https://doi.org/10.1108/MD-07-2014-0464>
- Mkenda PA, Mbega E, Ndakidemi PA (2017) Accessibility of agricultural knowledge and information by rural farmers in Tanzania—a review. *J Biodivers Environ Sci* 11:216–228
- Moorman C (1995) Organizational market information processes cultural antecedents and new product outcomes. *J Mark Res* 32(3):318–335
- Mugonya J, Kalule SW, Ndyomugenyi EK (2021) Effect of market information quality, sharing and utilisation on the innovation behaviour of smallholder pig producers. *Cogent Food Agric* 7(1):1948726



- Muhanguzi D, Ngubiri J (2022) Challenges smallholder farmers face in extracting value from agricultural information. *Afr J Inf Syst* 14(1):1
- Mujuni A, Natukunda K, Kugonza DR (2012) Factors affecting the adoption of beekeeping and associated technologies in Bushenyi District, Western Uganda. *Development* 24(08):1–19
- Mun YY, Jackson JD, Park JS, Probst JC (2006) Understanding information technology acceptance by individual professionals: toward an integrative view. *Inf Manag* 43(3):350–363. <https://doi.org/10.1016/j.im.2005.08.006>
- Naveed MA, Hassan A (2021) Sustaining agriculture with information: an assessment of rural Citrus farmers' information behaviour. *Inf Dev* 37(3):496–510
- Ndyomugenyi EK, Odel I, Okeng B (2015) Assessing honey production value chain in Lira Sub-county, Lira District, northern Uganda. *J Livest Res Rural Dev* 27(1):7–90
- Odongo W, Dora M, Molnár A, Ongeng D, Gellynck X (2016) Performance perceptions among food supply chain members: a triadic assessment of the influence. *Br Food J* 118(7):1783–1799. <https://doi.org/10.1108/BFJ-10-2015-0357>
- Omar R, Ramayah T, Lo M, Sang TY, Siron R (2010) Information sharing, information quality and usage of information technology (IT) tools in Malaysian organizations. *Afr J Bus Manag* 4(12):2486–2499
- Otim AS, Kajobe R, Kungu JM, Echodu R (2018) The socio-economic factors influencing honey production in Uganda. *Glob J Agric Res* 6(2):1–9
- Ottum BD, Moore WL (1997) The role of market information in new product success-failure. *J Prod Innov Manag* 14:258–273
- Phiri A, Chipeta GT, Chawinga WD (2019) Information behaviour of rural smallholder farmers in some selected developing countries: a literature review. *Inf Dev* 35(5):831–838
- Prince S, Chapman S, Cassey P (2021) The definition of entrepreneurship: Is it less complex than we think? *Int J Entrep Behav Res* 27(9):26–47. <https://doi.org/10.1108/IJEBR-11-2019-0634>
- Raghunathan S (1999) Impact of information quality and decision-maker quality on decision quality a theoretical model and simulation analysis. *Decis Supp Syst* 26(4):275–286
- Rauch A, Wiklund J, Lumpkin GT, Frese M (2009) Entrepreneurial orientation and business performance: an assessment of past research and suggestions for the future. *Entrep Theory Pract* 33(3):761–787. <https://doi.org/10.1111/j.1540-6520.2009.00308.x>
- Sanova P, Svobodova J, Hrubcova B, Serakova P (2017) Segmentation of honey buyers' behaviour by conjoint analysis. *Sci Agric Bohem* 48(1):55–62. <https://doi.org/10.1515/sab-2017-0008>
- Seenuankaew U, Vongprasert C (2015) Information behaviors in value adding of farmers' production and marketing in Thailand. *New Lib World* 116(34):227–242. <https://doi.org/10.1108/NLW-07-2014-0089>
- Seenuankaew U, Rattichot J, Phetwong W, Leenaraj B (2018) Farmers' information needs and seeking that lead to mobile phone application development for production and marketing promotion in Thai. *Inf Learn Sci* 115(5/6):246–259. <https://doi.org/10.1108/ILS-06-2017-0051>
- Sialuk SC (2014) Determinants of beekeeping in enhancing environmental conservation in arid and semi arid lands in Kenya: a case of Lomut Ward, West Pokot County. Unpublished MA Thesis, University of Nairobi, Nairobi
- Tarekegn K, Haji J, Tegegne B (2017) Determinants of honey producer market outlet choice in Chena District, southern Ethiopia. *Agric Food Econ* 5(1):1–14. <https://doi.org/10.1186/s40100-017-0090-0>
- Tirfe AG (2014) Smallholder farmers' innovation and its determinants: the case of Hirty Mekan Seed Producers' Cooperative, Tigray, Ethiopia. *Dev Country Stud* 4(21):104–115
- Vora D, Vora J, Polley D (2012) Applying entrepreneurial orientation to a medium sized firm. *Int J Entrep Behav Res* 18(3):352–379. <https://doi.org/10.1108/13552551211227738>
- Wilton PC, Myers JG (1986) Task, expectancy, and information assessment effects in information utilization processes. *J Consum Res* 12(4):469–486
- Wójcik-Karpacz A, Kraus S, Karpacz J (2022) Examining the relationship between team-level entrepreneurial orientation and team performance. *Int J Entrep Behav Res* 28(9):1–30. <https://doi.org/10.1108/IJEBR-05-2021-0388>
- Yadeta GL (2015) Honey production and marketing in Ethiopia. *Agric Biol J N Am* 3(1):42–46. <https://doi.org/10.5251/abjna.2016.7.5.248.253>

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