Moving Beyond Behavioral Intentions: Using TAM to Design Software for Beekeepers and Measure Adoption Rates

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Motivation

• **Bees are in trouble.** Over the last decade, beekeepers have experienced significant annual losses in their bee populations.

• **Beekeepers are important to humanity.** Bees are the primary pollinators of cultivated crops. In fact, one-third of all global agriculture relies on pollination from bees.

• **Technology can help.** Examining related industries, we can see several advantageous opportunities for impacting bee health including data collection, good data management, external data integration, and analysis of data.

• **Beekeepers have been slow to adopt new technologies.** This makes beekeepers an ideal group to test the theories of adoption and diffusion of technology because they are, as a group, at the very beginning stages of adopting new technologies to help care for their bees.

Objectives

• Study actual adoption rates of software for beekeepers using before and after acceptance rates of the original software and a new version redesigned according to key principles from the Technology Acceptance Model (TAM).

• Provide recommendations to improve software adoption rates based on analysis of user feedback gathered from surveys.

Technology Acceptance Model (TAM)

TAM is a derivation of the Theory of Reasoned Action, customized for the prediction of information technology (IT) adoption and use.

Methodology

Our research partner, HiveTracks.com, the leading software provider to beekeepers, provides all of the data to study actual and perceived adoption rates from beekeepers. In March of 2018, Hive Tracks sent out an online survey before rollout of the new version redesigned according to key principles from the TAM. The survey asked a total of 25 questions, including scale based questions and open-ended comments for user perceived ease of use, usefulness, enjoyment, and future use along with demographic related questions.

Survey User Feedback

<table>
<thead>
<tr>
<th>Comment Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hive Tracks is too expensive</td>
<td>27%</td>
</tr>
<tr>
<td>Hive Tracks is a great product</td>
<td>20%</td>
</tr>
<tr>
<td>App is difficult to use in the field</td>
<td>10%</td>
</tr>
<tr>
<td>App should have same functionality as the site</td>
<td>9%</td>
</tr>
<tr>
<td>Need tutorials or manual</td>
<td>6%</td>
</tr>
</tbody>
</table>

Recommendations

• **The software needs to provide insights.** Hive Tracks is focused on data collection and data analysis is only useful if the user can pull insights from the data.

• **Create a free version,** that will expand the market to gather more valuable data that can be used in research and providing intelligence to aid beekeepers in the care of their hives.

• **Promote a citizen science program,** to take advantage of passionate hobbyists who are well educated.

Moving Forward

The next steps for this research project include:

• Quantifying actual usage, by using the data stored from Hive Tracks.

• Extend TAM by connecting the perceived intention to use the software to actual usage, by measuring before and after usage compared to their previously measured intention of use.

• Conduct and analyze additional surveys after the rollout of the new version redesigned according to principles from the TAM.

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