COMPETING AGAINST ELECTRONIC INTERMEDIARIES - THE CASE OF DIGITAL MUSIC

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Abstract

The development of Internet technologies and e-commerce has opened up new possibilities for suppliers to address their consumers directly. However, it has also posed new challenges for suppliers to position themselves against intermediaries, who may have been necessary partners in brick-and-mortar worlds, but are now also competitors. Despite significant potential savings by excluding intermediaries from their supply chains, in many markets suppliers have for the time being lost the battle against intermediaries. We focus on the case of digital music and use experimental techniques to analyse how consumers search for products and how they intuitively respond to changes in several vendor and market-related parameters. We implement a simplified task that is easy to understand but does not allow participants to calculate optimal solutions. Employing various measurements for the acceptance of supplier and intermediary online shops, we find that consumers are especially responsive to changes in price and supplier product assortment, while a higher number of suppliers in the market does not necessarily lead to a stronger desire for intermediation.

Keywords: Intermediation, e-commerce, consumer product search, transaction costs, experimental economics.
1 Introduction

Intermediaries, with their bridging function in the distribution of goods between suppliers and consumers, have been known for centuries. However, e-commerce has provided suppliers with new opportunities to open online shops and to exclude intermediaries by distributing products directly to consumers. Instead of seeing intermediaries as partners they must rely on, suppliers may now consider electronic intermediaries as competitors, from which they have to differentiate their offering and against which they must position themselves. By excluding electronic intermediaries and selling products directly to consumers, suppliers could save the revenue share previously claimed by intermediaries. Therefore, suppliers have an interest in selling directly to consumers.

However, in many markets, intermediaries still seem to be powerful. Good examples include the markets for flights and travel, wholesale shopping as well as various media products, such as books or music (both in digital and physical form). One reason for intermediary strength is likely to be a larger product offering, since intermediaries usually aggregate products from various suppliers. As a result, consumers may save search time and effort. Furthermore, many intermediaries have a strong brand image that may lead to consumer trust.

But how can suppliers make their online shops more appealing to consumers? After all, it is a consumer’s decision what to buy and where. We hold that if consumer searching and purchasing behaviour were better understood, suppliers could better align their product offer to consumer needs. We address this by analysing consumer behaviour and by posing the following research questions: When do consumers tend to buy from an intermediary instead of directly from the supplier and what are the main antecedents that underlie this decision? Instead of providing purely qualitative reasons and motivations, we seek to further quantify the potential influence factors.

We focus on digital music, a good that also profits from e-commerce in another way. In this case, there is no need for physical stock (presumably one of the primary functions of intermediaries), since products can be reproduced and delivered to the consumer promptly. In the digital music market, music labels represent suppliers whose online shops compete against various intermediary online shops, such as the market leader, the Apple iTunes Store. The suppliers’ offering currently seems less successful than that of the intermediary online shops.\(^1\) Furthermore, inspired by Apple’s success, Google recently announced that it would launch a similar offering. As a result, competitive pressure on the music labels’ shops may increase further. Owing to current competitive developments, and because digital music represents another market in which, for now, suppliers are losing the battle against intermediaries, we hold that this is an appropriate context for the above-mentioned research questions.

While the best way to address these questions would be to gather field data, such data however must meet several demands: (i) the different parameters would have to be analysed separately, (ii) other disturbing influence factors would have to be excluded, and (iii) there would have to be full control of the change to certain parameters at any given time; if this is not possible, different data sets should be used. However, in this case, the different data sets would still have to be comparable in some way. First, needless to say, both intermediaries as well as suppliers are generally reluctant to disclose purchase data. But even if we had field data, we believe that these would be accompanied by a number of drawbacks. Especially the requirement to change several parameters at specific times is a demand that is near impossible to meet.

We therefore use an economic laboratory experiment to examine potential influence factors on consumer decisions between intermediary purchases or supplier-based purchases. In turn, a laboratory

\(^1\) As part of the local experiment, we conducted a separate questionnaire asking participants about their experience with buying digital music. Out of the 160 participants only 3 had ever bought music from the online shop of a music label, while 127 did buy some digital music from online intermediaries, such as the Apple iTunes Store.
experiment seems suitable, because it enables us to control the exact influence of the various parameters, and to design a decision-making environment in which potential influencing factors can be evaluated unequivocally.

2 Related Literature

This project builds mainly on existing work and insights from research on intermediation in e-commerce environments and on consumer product search. Intermediation has been a research subject long before e-commerce (Biglaiser, 1993; Rubinstein and Wolinsky, 1987; Spulber, 1996). However, the development of Internet and e-commerce technologies has created new research perspectives and opportunities, such as two-sided-platforms (Bakos and Katsamakas, 2008; Evans, 2003). Central to both research strands is the assumption that search cost reduction is one of the major functions of market intermediaries and through which intermediaries create additional value. Only some more recent approaches discuss the possibility that intermediaries may have an interest in doing the opposite by intentionally increasing search costs for consumers (Ellison and Ellison, 2009; Hagiu and Jullien, 2011). Most such work applies analytical models and motivates intermediation’s potential benefits from a market perspective. It assumes that consumers make optimal purchase decisions. However, such optimal decisions require full information, which consumers seldom have. In contrast, since we believe that consumer decisions are not only governed by classical economic principles, we focus on analysing de facto consumer behaviour.

In comparison to brick-and-mortar environments, the advent of e-commerce has led to significantly lower search costs, since it is much easier to compare various shops and prices online. In turn, this can be seen as one of the key competitive advantages of electronic markets (Bakos, 1997; Grewal et al., 2003). This is particularly important in the local context, as search costs can have a significant impact on what consumers buy and also affects consumer welfare (Su, 2008; Wu et al., 2004). However, although Internet technologies help to reduce search costs, Internet shopping still require significant consumer time and effort (Brynjolfsson et al., 2010; Hinz and Eckert, 2010). Besides the dominant market power of specific large intermediaries, this is probably why consumers only visit an average of 1.3 to 2.1 CD sites per month (Johnson et al., 2004; Zhang et al., 2007). One component of the incurred costs is called “frictional costs” (Hann and Terwiesch, 2003). Frictional costs imply that the search process does not stop with the identification of other online shops, since consumers must still invest time and effort to navigate through different user interfaces and to enter order and payment information. These costs can be seen as the disutility related to the conduct of an online transaction and may therefore prevent consumers from searching for alternative online shops.

Although consumers are at the centre of the last-mentioned research strand, these approaches usually omit a specific distinction between different vendor types, i.e. suppliers and intermediaries, which is our primary interest here. Analysing consumer decisions has deepened understanding of motives and actions, but gaining insights on the choices between intermediaries and suppliers requires a strict differentiation between these two types of market subjects.

To the best of our knowledge, consumer product search processes and choices between online intermediary and supplier shops have not been analysed within an integrated framework. We explicitly combine both aspects and analyse how consumers actually decide between intermediaries and suppliers. We also focus on the impact of certain parameters that are either governed by the supplier or defined by the market structure. We outline the applied research model, underlying assumptions and deductive hypotheses in the next section.
3 \hspace{1em} \textbf{Research Model}

3.1 \hspace{1em} \textbf{Experimental layout}

The experiment was fully computerised using the experimental software z-tree (Fischbacher, 2007). We conducted 8 sessions with a total of 160 participants, mostly consisting of graduate and undergraduate students from various fields. Participants were randomly assigned into two different groups. All participants had to complete 24 rounds, consisting of 3 different phases with 8 rounds each. Each session lasted about 40 minutes and participants earned on average approximately 13 EUR. In order to prevent fatigue during the experiment, participants received interim information on their current payment. Needless to say, we also ensured that participants understood the task, with elaborate instructions and sample screens providing a clear picture of the experiment. Furthermore, participants had to complete one test round for each phase prior to the experiment itself.

3.2 \hspace{1em} \textbf{Experimental task}

There are three different market subject types in the experiment: suppliers, intermediaries and consumers; the first two are computerised. Furthermore, there is only one type of good involved: digital music tracks. Each track belongs to one of three product genres, has a specific price as well as a certain value for participants (see Section 3.3). In accordance with the random utility theory, a good’s overall utility is a single value that integrates all attributes of a good besides price (McFadden, 1986). In each round, participants receive a certain fixed endowment of 100 experimental units. The basic task is now to maximise the personal utility by purchasing music tracks for which the utility is greater than the cost. Participants have the opportunity to buy an arbitrary number of tracks from one of several supplier shops or from one intermediary shop, as long as they have sufficient funds. However, a specific good can be purchased only once during one round. All participant decisions are independent from those of other participants.

To learn more about a shop’s (both intermediary and supplier shops) various products, participants can visit a shop by clicking on it. Once participants have visited a shop, they get to know the utilities and the prices of its products and may choose one or many of these, provided they have sufficient funds. Participants may visit each shop as often as they like and in any order (even repeatedly), whereas visiting a shop is independent of a purchase. However, when visiting a shop for the first time, participants pay a certain search cost amount for their visit. In contrast, products from previously visited shops can be “recalled” without paying search costs again, i.e. only the first visit to a new shop involves search costs, but all subsequent visits to it in one round are free of charge. Referring to the notion of frictional costs, the rationale for this is that consumers need time and effort to become familiar with an online shop they have not visited before, and they may have to complete a compulsory registration. These costs are presumably much larger when visiting an online shop for the first time; for the purpose of simplifying, the costs incur only on the first visit to a shop.

Before visiting another “new” shop, participants must take two key decisions. They must:

a) determine which of the products that have already been viewed are the most attractive, given their utility and price (product comparison decision), and

b) decide to terminate or to continue the search by visiting additional shops (stopping decision).

When deciding whether or not to continue searching, participants weigh the search cost against the attainable utility in relation to the products inspected to date. Participants should therefore only continue to search if they believe the search cost to be lower than the expected utility gain from this step (Häubl et al., 2010). If participants decide to terminate their search, the products with the best utility/price ratio should be selected first, and products could belong to the currently inspected shop or to a previously inspected shop.

This situation builds on the famous knapsack problem, which is known to be NP-complete. However, our task is more complex than the basic knapsack problem, since participants do not see all products at
once, but must decide whether they want to visit another shop and pay additional search costs, thereby potentially decreasing their profit. Due to the problem’s complexity, participants are unable to calculate optimal decisions in advance and can therefore only apply intuitive approaches or heuristics. To increase participant motivation, the payment depends upon the results achieved. After each round $i$ participants receive the payoff $y_i$, which is calculated based on the accumulated utility $u_i$ of all purchased goods and the remaining account balance $b_i$ in the specific round. In other words, participants should seek to maximise the difference between the purchased products’ total utility minus all the search costs. The total payoff $y$ is eventually the sum of the payoffs from all single rounds:

\[
\text{Payoff after each round: } \quad \text{max} \rightarrow y_i = b_i + u_i \quad \text{while } b_i, u_i \geq 0
\]

\[
\text{Total payoff: } \quad y = \sum y_i
\]

### 3.3 Distribution of goods

The distribution of goods and prices in the experiment is subject to certain parameters and functions that were fully disclosed to the participants. Each music track has a certain price, a utility and a specific product genre, which represents a specific music style, artist or age, among others. The goods in every shop as well as their respective prices, utilities and genres remain constant during one round. The price $p$ of a good $x$ is determined randomly in each round and underlies a uniform distribution within a range of 10 to 25 experimental units. The utility $u$ of the good $x$ is also determined randomly in each round and moves in a span of 10 experimental units around the previously determined price of the good; therefore:

\[
\text{Price for product } x: \quad p_x = [10\ldots25] \quad \quad \quad \text{Utility for product } x: \quad u_x = [p_x-10\ldots p_x+10]
\]

A good’s genre is set randomly to one of the values 1, 2 or 3. At the outset of the experiment, each participant receives a “favourite genre” that also corresponds to one of the values 1, 2 or 3; and remains constant across the entire experiment. If participants buy a good $y$ that matches their favourite genre, this good has a utility value that is on average 15 experimental units higher than a non-favourite good at the same price (again, a uniform distribution is assumed):

\[
\text{Utility for a product } y \text{ that belongs to the participant’s favourite genre: } \quad u_y = [p_y+5\ldots p_y+25]
\]

Although participants are free to buy any good, they are incentivised to look for goods that match their favourite genre, as they have a higher profit, on average.

### 3.4 Treatment parameters

To map the scenario in a lab environment, the three parameters price differences, product assortment differences and number of suppliers are implemented in a two-group setting, in which each participant must complete three phases. Phase I serves as a basis case against which potential differences in Phases II and III are analysed. Table 1 summarises the different treatments’ primary characteristics. The parameters’ underlying theoretical basis and specific implementation are outlined in the following.

<table>
<thead>
<tr>
<th>Phase (round)</th>
<th>Price advantage of suppliers (%)</th>
<th>Number of different genres per supplier</th>
<th>Number of suppliers Group A</th>
<th>Number of suppliers Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (01-08)</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>II (09-16)</td>
<td>15</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III (17-24)</td>
<td>15</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 1. Parameter values in the different treatments.*
a) Price differences

Evidently, price is a key determinant in consumer purchase decisions (Zeithaml, 1988). There is also a vast amount of literature on price dispersion between offline and online vendors (Brynjolfsson and Smith, 2000) and on price dispersion between different online vendors (Clemons et al., 2002). Prices for a single music track usually range from 0.69 EUR to 1.29 EUR in most online shops – both for intermediary and for supplier shops. However, if music is sold via intermediaries, music labels only receive a certain fraction of the revenue from the intermediary as the latter seeks to preserve a certain margin to finance its operations. Unfortunately, only little is known about the shares claimed by Apple and other intermediaries, estimates for the iTunes Store place this in the 10 to 30 percent range (Elmer-DeWitt, 2008). Assuming a very small cost increase for selling higher volumes, the intermediary’s margin is similar to what music labels could save if they sold their products directly to consumers. Therefore, price discounts seem to be one of the easiest options for suppliers to compete with intermediaries. Our experiment uses a fairly conservative 15% for the suppliers’ price advantage, which is effective in Phases II and III. It will be interesting to see whether a potential price discount makes consumers shoulder additional burdens in form of potentially higher search costs; this leads to Hypothesis 1:

H1: Suppliers can use the potential savings from excluding electronic intermediaries to increase the number of consumers that use their online shops.

b) Differences in product assortments

Typically, suppliers carry only the products they produce themselves, whereas intermediaries aggregate products from several suppliers and therefore usually have a broader product offering than one single supplier. On the other hand, despite a smaller product offer, suppliers may have a higher product depth and focus on specific niches – for instance, products they may want to sell exclusively or that do not fit an intermediary offering. Consumers may therefore end up finding a larger number of suitable products in specific areas in a supplier shop than in an intermediary shop.

We implement product mix differences between suppliers and the intermediary in two levels. While in Phases I and II, suppliers are very specialised and offer just one product genre, in Phase III suppliers possess a comparably higher product mix breadth and are therefore more like the intermediary. Still, also in Phase III, the only shop to carry all three genres is the intermediary shop.

As a uniform genre distribution in the market is assumed, in the case of three suppliers (Group A), there is exactly one supplier with Genre 1, one supplier with Genre 2, and one supplier with Genre 3. In the case of six suppliers (Group B), there are two suppliers with Genre 1, 2 or 3 each. In Phase III, the product offering for each supplier consists of two different genres, again uniformly distributed across the whole market.

<table>
<thead>
<tr>
<th>Phase (round)</th>
<th>Intermediary</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of products</td>
<td>Number of genres</td>
</tr>
<tr>
<td>I / II (1-16)</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>III (17-24)</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2. Differences between the intermediary and suppliers.

Participants do not know in advance what genre(s) a particular supplier carries. However, as suppliers do not carry all available genres in their stock, participants that visit one of the supplier shops may end up not finding a product from their favourite genre. In this case, participants may either want to continue the risky searching and visit another supplier or they could “play it save” by visiting the intermediary in the next step, thus being guaranteed to find a number of products from their favourite genre.

However, the overall question is whether suppliers should expand the product mix breadth (e.g. by establishing partnerships with other companies) or focus on a smaller, very specific product mix to
contrast their offer to the intermediary’s? A smaller product mix may lead to higher search costs for consumers, but also gives them the possibility to find more products that exactly fit their needs. Since we suspect that participants are fairly risk averse, we believe that many consumers do not take the risk of intensive search and directly go to the intermediary. However, if suppliers increase their product mix breadth and thus become more similar to an intermediary this should lead to an increase in supplier online shops’ popularity. Consequently:

\[ H2: \text{Suppliers can increase the amount of consumers to their shops by increasing the product mix breadth, even if this comes at the cost of a decreased product mix depth.} \]

c) Number of suppliers

In contrast to the price of its products and the number of available genres, a single supplier usually does not have a direct influence on the number of competitors in the market. However, the number of suppliers in the market may well have an effect on transaction costs, as complex markets with many participants are likely to need greater coordination efforts than smaller ones. One way to reduce the complexity of the relations between the different market subjects is intermediation. A possible reduction of contact costs in a given market structure through intermediaries has also been shown analytically (Baligh and Richartz, 1964). The aforementioned model concludes that intermediaries are especially beneficial when a higher number of suppliers is present. The reason for this is that in the model all consumers need to get in touch with all suppliers in order to get complete information on prices. A bridging intermediary that connects suppliers and consumers can therefore save significantly on costs if many suppliers are present.

For our analysis, the question is not whether each supplier shop considered separately suffers owing to fewer consumer visits (which is likely, given an increase in the number of competitors), the question is whether all suppliers, taken together, lose consumer visits compared to the intermediary. Although suppliers usually do not have full control of this factor, this may still give them more insights into their competitiveness and allow them to evaluate whether it is worth their while having their own online shop in the first place.

To account for these variations, the local experiment is set up with two different groups, of which one models a market with three suppliers, while the other market operates with six suppliers. Due to the uniform distribution of product genres in the market, this has further implications on the participant’s likelihood of finding products in their favourite genre in a supplier shop. Since there is a higher number of shops in the market not carrying a participant’s favourite genre, with six suppliers searching may take longer as participants seek to find products in their favourite genre. In line with this, Hypothesis 3 is:

\[ H3: \text{The higher the number of supplier shops in a market, the more consumers will make use of the intermediary shop.} \]

3.5 Measurements

We seek to identify potential changes in consumer search behaviour by using four distinct measurements: a) average share of participants visiting the intermediary shop first within a round (without seeing a supplier shop before), b) average share of participants visiting the intermediary shop at some point within a round (includes direct visits to the intermediary shop), c) average share of revenue spent at the intermediary shop, and d) average number of different shops visited (includes both intermediary and supplier shops).

As noted, participants have two choices when looking for products that match their favourite genre: They could take the fairly risky path of visiting one or many supplier shops in order to find a large number of products from their favourite genre, but also with the risk of not finding them immediately and paying a higher amount of search costs. However, they could also take the safer route and visit the intermediary shop directly, with the guarantee to finding a certain number of products from their favourite genre and the freedom to spend their remaining budget on other products. Taking the latter route, it is fairly unlikely that participants will want to visit a supplier shop after visiting an
intermediary shop. The percentage of participants visiting the intermediary shop first is therefore the strongest indicator for participant attraction towards the supplier shops. The more participants visit the intermediary shop without having visited a supplier shop before, the lower the likelihood of suppliers selling their products.

However, it is also plausible that participants may try their luck and visit a few suppliers and, if these suppliers do not carry their favourite genre, return to the intermediary shop and spend their remaining budget. The second measure – average intermediary visits at some point in time within a round – therefore seeks to support the first measure. By definition, results for this measure need to be at least as high as in a). A large increase between b) and a) may indicate that some participants used one or many supplier shops but were not content with the supplier shop’s offering and therefore returned to the intermediary shop. In order to better control for this we also measure the share of revenue participants spent at the intermediary shop.

Finally, in addition to which shop types the participants chose and how much they spent there, the average number of different shops visited (including the intermediary shop) per round indicates whether a certain treatment has led participants to increase search efforts and thus to paying higher search costs.

The conceptual research model – including all variation factors, market subjects and measurements – is outlined in Figure 1.

![Conceptual research model](image)

**Figure 1.** Conceptual research model.

### 4 Results

An overview of the results is provided in Table 3, which reports the aforementioned measurements for each of the three phases, with the number of product genres per supplier (PG) and the price advantage for suppliers in percent (PA).

Both the Kolmogorov-Smirnoff test as well as other graphical indicators such as QQ-plots and histograms indicate that most of the data from the different treatments do not follow a normal distribution. Thus we applied the Wilcoxon signed-rank test for dependent samples (across phases) and are further described here. In the case of we used and for the independent samples (between groups) we used the two-sample U-test.
### Table 3. Results for the different treatments.

<table>
<thead>
<tr>
<th></th>
<th>Phase I (PG=1,PA=0)</th>
<th>Phase II (PG=1,PA=15)</th>
<th>Phase III (PG=2,PA=15)</th>
<th>Overall average</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a) Average share of visits to the intermediary shop as the first shop within a round</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A (3 suppliers)</td>
<td>0.80</td>
<td>0.36</td>
<td>0.25</td>
<td>0.55</td>
<td>0.41</td>
</tr>
<tr>
<td>Group B (6 suppliers)</td>
<td>0.76</td>
<td>0.38</td>
<td>0.27</td>
<td>0.54</td>
<td>0.41</td>
</tr>
<tr>
<td><strong>b) Average share of intermediary shop visits at some point within a round</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A (3 suppliers)</td>
<td>0.85</td>
<td>0.46</td>
<td>0.35</td>
<td>0.64</td>
<td>0.38</td>
</tr>
<tr>
<td>Group B (6 suppliers)</td>
<td>0.83</td>
<td>0.51</td>
<td>0.46</td>
<td>0.66</td>
<td>0.38</td>
</tr>
<tr>
<td><strong>c) Average share of revenue spent at intermediary shop per round</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A (3 suppliers)</td>
<td>0.80</td>
<td>0.42</td>
<td>0.27</td>
<td>0.57</td>
<td>0.38</td>
</tr>
<tr>
<td>Group B (6 suppliers)</td>
<td>0.78</td>
<td>0.46</td>
<td>0.36</td>
<td>0.59</td>
<td>0.37</td>
</tr>
<tr>
<td><strong>d) Average number of different shops visited (including the intermediary shop) per round</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A (3 suppliers)</td>
<td>1.33</td>
<td>1.57</td>
<td>1.49</td>
<td>1.42</td>
<td>0.44</td>
</tr>
<tr>
<td>Group B (6 suppliers)</td>
<td>1.42</td>
<td>1.60</td>
<td>1.51</td>
<td>1.46</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Results across the different phases

The data in panel a) tell us that for Group A and for Group B the fraction of direct visits to the intermediary shop (i.e. the intermediary is the first shop that a participant visits during one round) in Phase II is significantly smaller than in the basic scenario of Phase I (p < 0.001; Wilcoxon signed-rank test). In both cases, the supplier’s price discount leads to approximately double the number of participants who visit one of the supplier shops first. This is also confirmed by the number of intermediary visits at any point in time during a round, which in Phase II drops by approximately 46% for Group A and 39% for Group B (p < 0.001; Wilcoxon signed-rank test). The average share of revenue spent at the intermediary shop as indicated in panel c) also decreases by 48% respectively 41% for Groups A and B (p < 0.001; Wilcoxon signed-rank test). Since participants may not find their favourite genre at the first few supplier shops, the decrease in intermediary visits leads also to a statistically significant increase in the total number of shops visited (p < 0.001; Wilcoxon signed-rank test). Summarising the evidence from panels a) to d) in Table 3, we can see that consumers are willing to take higher risks and efforts of searching further and perhaps not finding the right product immediately. Therefore, we see a strong increase in supplier shop visits and find strong support for Hypothesis 1.

However, suppliers may be tempted to compete with intermediaries not only on price, but may also seek to increase their revenues by offering a broader product mix. Phase III maps a setting in which the price discount from Phase II is combined with an increase in the suppliers’ product mix breadth. To check for potential effects of this, Phases II and III are now compared with each other.

Panel a) indicates a further decrease in direct intermediary shop visits compared to Phase II. Rates have dropped by another 31% for Group A and 29% for Group B. Differences for Group A are statistically significant at the 0.01 level, while for Group B they are significant at the 0.05 level (p = 0.018, Wilcoxon signed-rank test). For the number of all intermediary visits from panel b), rates have dropped by about another 24% for Group A and 10% for Group B, compared to Phase II. However, the differences between the two phases are only significant for Group A, with p = 0.019, but not for Group B (p = 0.389; Wilcoxon signed-rank test). The measure for revenue spent at the intermediary shop confirms this as we see a decrease of almost 36% for Group A and 22% for Group B, with the latter one being only weakly significant (Group A: p < 0.001; Group B: p = 0.062; Wilcoxon signed-rank test). The results from panel d) tell us that despite both groups visiting supplier shops more often,
the number of different shops visited decreases. This may first come as a surprise, since following the logic from the comparisons of Phases I and II – that if participants use suppliers more often, search costs should increase since the chances of finding a participant’s favourite genre are lower and thus participants have to visit more shops. This is also true here. However, compared to Phase II, there is a second factor that antagonises this: the suppliers’ increased product mix breadth. Therefore, although participants use suppliers more often, the chances of finding their favourite genre are now better than in Phase II, which is why we see a decrease in the average number of different shops visited. However, the differences are only weakly significant (Group A: p = 0.186; Group B: p = 0.076, Wilcoxon signed-rank test). As noted in Section 3.4, there is little reason for participants not to first visit the intermediary shop in Phase III. Given that despite this, the share of direct and later intermediary visits decreases for both groups (although the latter one is not significant for Group B), we conclude that the product breadth increase leads to an increase in the number of supplier visits, and therefore accept Hypothesis 2.

Results between the different groups

In order to check whether a higher number of suppliers leads to an increase in the intermediary shop’s attractiveness, differences between the two groups are analysed for all three phases.

Looking at the share of cases where the intermediary shop has been visited first in panel a), the data show mixed results. Only in Phases II and III are these slightly higher in Group B than in Group A (6% and 8%), whereas in Phase I the opposite is the case (5% lower). However, none of the results is statistically significant (Phase I: p = 0.486; Phase II: 0.959; Phase III: 0.916, two-sample U-test). This is also the case for the number of intermediary shop visits at any time during a round, which is higher for Group B in Phase II (11%) and Phase III (31%), but slightly lower in Phase I (2%). Again, none of the differences are statistically significant (Phase I: p = 0.616; Phase II: 0.406; Phase III: 0.132, two-sample U-test). In line with this, the share of revenue spent at the intermediary shop (panel c) shows the same pattern, being 10% and 33% higher for Group B in Phases II and III, but 5% lower in Phase I. Again, none of the differences is statistically significant (Phase I: p = 0.389; Phase II: 0.441; Phase III: 0.138, two-sample U-test). Furthermore, in terms of the average number of different shops visited by participants in one round from panel d), the differences between the two groups are fairly small (at most 7%) and also not statistically significant (Phase I: p = 0.216; Phase II: 0.717; Phase III: 0.753, two-sample U-test).

Although search costs were fairly high compared to the average product price and although more suppliers mean a higher average risk for participants of not finding their favourite genre, participants did not act differently in these two cases. Apparently, besides accepting a slightly higher risk for increasing search costs, the inhibition threshold when being confronted with more shops seems to be quite low. This is probably because participants do not intend to visit all shops in the market; instead, they limit the number of supplier shops they visit before visiting the intermediary shop. As a result, we reject Hypothesis 3 – that a higher number of suppliers weakens suppliers’ competitive positions against the intermediary.

5 Conclusions and Limitations

Our principal aim in this paper was to provide new insights on how consumers decide between intermediary and supplier shops when looking for digital music on the Internet. We hereby hope to contribute both to the theoretical body of knowledge as well as concerning practical implications for suppliers and for intermediaries. Gaining more knowledge on why consumers may prefer electronic intermediaries can help suppliers to be more responsive to consumer demands as well as to increase consumer willingness to pay. We will now discuss the study results and point to several limitations and further opportunities for research:

1) Price discounts resulting from potential savings due to the exclusion of electronic intermediaries is an effective way to increase the number of consumers that make use of online supplier shops.
We find strong evidence for the impact of price. In our case, even a comparably small discount of 15% offered by suppliers leads to significant increases in consumer purchases. Given current estimates of Apple’s profit margin in the iTunes Store, 15% seems to be a conservative estimate of the potential savings music labels may realise if they manage to exclude intermediaries from their supply chain. However, it is very likely that many music labels have binding contracts or may fear ongoing conflicts with powerful intermediaries. Therefore, competing on price seems to be an option for those music labels that can afford to challenge their relations to intermediaries. This finding may be particularly relevant in the case of digital music, since intermediaries for digital music may have difficulties to add additional value to the final products, given that trust is presumably not an issue when buying directly from music labels and that there is usually no difference in the quality of the product.

2) **By increasing the product mix breadth and thus becoming more similar to an intermediary, suppliers can further increase the number of consumers that use their online shops, even if this comes at the cost of a decreased product mix depth.**

The risk of not finding the right products and thus having to continue their search and to visit more online shops seems to be a major issue for consumers and, in turn, one of the main advantages of intermediary shops that are able to carry a large number of products. However, we have shown that if music labels increase their product mix breadth and thus reduce the search risk for consumers, they will be rewarded by an increase in visitors to their shops. As indicated here, this is even true if the suppliers keep the total number of products on offer fixed, but increase their product mix breadth, thus having an equally large but less specialised product offer. In order to increase their product mix breadth, music labels could think about forging alliances with other music labels.

3) **A higher number of supplier shops in a market does not necessarily strengthen the intermediary’s competitive advantage.**

In contrast to the assumptions of Baligh and Richartz’s (1964) model, consumers do not seem to aim for full price information, probably because search efforts and costs would be too high. Instead, many limit their search to a few supplier shops and if they do not find the desired product, they then visit an intermediary. Therefore, we did not see any significant changes in the number of shops visited or in the intermediary or supplier shops decision between the two groups in the experiment. Overall, understandings of contact and search costs in e-commerce seem to have changed, and the applicability of contact costs and search cost should be subject to concrete analysis.

The study also has some limitations that create interesting future research opportunities. Firstly, although we sought to provide a fairly general scenario and to implement the most important parameters, the validity of the study findings should be tested in other scenarios. For instance, in our case – the search for a relatively inexpensive good – the search costs for visiting another online shop were assumed to be fairly high. However, in other scenarios, reasonable values for search costs may be much lower compared to the average price of a product. Also may differences between suppliers and intermediaries be larger or smaller in other scenarios.

Secondly, in our case, consumers enter a market with different product offerings and vendors in every round. In reality, since consumers may build relationships of trust with certain vendors, their future purchase decisions therefore are likely to dependent much on their previous purchase decisions. Therefore it is important for suppliers to create awareness of and trust towards their online shops, since many consumers may not even know that certain suppliers have their own online shops.

Thirdly, despite our attempts to provide a comprehensive picture, the methodology we applied and a quest for simplicity led us to exclude other potentially relevant factors and to formulate various assumptions. In our model, search efforts imply a certain cost for consumers. However, search efforts could also imply positive effects for consumers, such as an increased level of expertise (Aggarwal and Mazumdar, 2008). We did also not cover the influence of contractual relationships between music labels and intermediaries, which may have a large impact on any music label’s freedom to alter its product offering or its prices. Consumers may also face potential lock-in effects – for example, different file formats – which may make switching more difficult for consumers than we assumed. Future studies should therefore also identify and seek to explicitly understanding the motives that underlie consumers’ decisions and actions, as well as to identify consumer search strategies.
References