Analyzing Seller Practices in a Brazilian Marketplace

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Introduction

- Past few years:
  - Fast and significant growing of online commercial activity enabled by Web applications;
  - Electronic marketplaces (Amazon and eBay):
    - Great popularity and revenue;
    - Emerging as one of the most relevant scenarios of B2C and C2C.

Introduction

- **In this rich scenario of e-markets:**
  - Thousands of players trade billions of dollars, interacting with each other:
    - Buying and selling products;
    - Exchanging information and knowledge;
    - Establishing different kinds of relationships.

- **A biggest challenge in e-markets:**
  - Understanding the complex mechanism that guides the results of the negotiation.

Introduction

- There are important factors that can be considered to analyze selling practices:
    - Seller's reputation and experience;
    - Offer's price and duration.

- How these factors affect the results?
    - Useful for buyers, sellers and e-market's provider.

Introduction

- Buyers: may choose to <u>negotiate with more trustable sellers</u> and <u>save money</u>.

- Sellers: can <u>make decisions</u> that <u>increase the chances of achieving success</u> in the negotiation or to sell faster.

- The marketplace: can provide <u>specific services</u> that will <u>help buyers and sellers</u>, increasing its <u>popularity</u> and <u>revenues</u>.

Introduction

- ## This work:

  - Follows a methodology to characterize fixed-price online negotiations.

  - Determining and analyzing the selling practices in a Brazilian marketplace.

- ## Hypothesis:

  - (1) Seller profiles choose different strategies to configure their offers;

  - (2) The impact of the selling strategy on negotiation results depends on the seller profile.

Introduction

Inputs:
-Duration
-Price
-Product / Item
-Seller Reputation
...
-Etc.

Negotiation

Outputs:
-Qualification
-Time to Sell
-Winner
...
-Etc.

Related Work

- Online auctions (many researches):
  - Several studies have focused on reputation systems and trust in online auctions.
  - Analysis of the importance of reputation in auction outputs, mainly in final prices.
  - Resnick et. al (*The Economics of the Internet and E-Commerce, 2002*):
    - show that sellers with high reputation are more capable of selling their products, but the gains in final prices are reduced;
    - In general, bidders pay higher prices to sellers with higher reputation.

Related Work

- Many studies about the adoption of Buy-it-now (BIN) option on eBay:
  - Experienced sellers use BIN more frequently;
  - Offers with BIN from sellers with high reputation are accepted more frequently.

Marketplace Description

- New marketplace of the biggest Latin America Internet Service Provider (UOL Inc.):
  - Coverage: June/2007 - July/2008;
  - 32 product categories with 2,189 subcategories;
  - Fixed price and auction;
- Due to a confidentiality agreement, most of the quantitative information about this dataset can not be presented.

Marketplace Description

Methodology

- Distinguish Sellers from their selling strategies;
- Test the two aforementioned hypotheses;
- Key points:
  - First identify patterns among the inputs and then correlate them with outcomes;
  - Consider the different input types (e.g., seller reputation, offer's price).

Methodology

- Steps:
  - 1) Defining negotiation inputs;
  - 2) Defining negotiation outcomes;
  - 3) Data engineering;
  - 4) Identifying seller profiles;
  - 5) Identifying seller strategies;
  - 6) Analysis of selling practices.

Characterization & Analysis

1) Defining negotiation inputs

- Seller's characteristics:
  - Retailer;
  - Certified;
  - Qualification;
  - Time;
  - Items.

Characterization & Analysis

1) Defining negotiation inputs

- Offer configuration:
    - Highlight;
    - Price;
    - Duration;
    - Images;
    - Quantity.

Characterization & Analysis

1) Determining negotiation inputs

Seller's Characteristics → Seller Profiles

Offer Configuration → Selling Strategies

Characterization & Analysis

2) Defining negotiation outcomes

- Success indicators;

- Price (P);

- Volume (V);

- Views;

- Transaction's Qualification (Q);

- Duration (D).

Characterization & Analysis

3) Data engineering

- Pre-process the data to improve their quality
  - Inconsistent data;
  - Consider offers with negotiations;
  - Consider prices per category;
  - Attribute normalization.
- Prepare data for clustering.

Characterization & Analysis

- Notation to simplify data analysis:

Notation (symbol)	Meaning
▼▼	very low value
▼	low value
●	average value
▲	high value
▲▲	very high value

Characterization & Analysis

4) Identifying seller profiles

– Based on seller's characteristics;

– Clustering (data mining): X-means (efficient algorithm that extends K-means);

- Statistical metrics: average, median, dispersion metrics (standard deviation, co-variance);

- Analysis of variance (ANOVA) to validate the cluster's: results statistically different.

Characterization & Analysis

4) Identifying seller profiles (16 groups)

	Seller Profile - Characteristics				
Cluster	Retailer	Certified	Qualification	Time	Itens
P0 (2.25%)	Y	N	▲▲	●	▲
P1 (2.51%)	N	N	●	●	▲
P2 (0.93%)	N	N	▲	▼	▲
P3 (6.57%)	N	N	●	▼	▼
P4 (6.6%)	N	N	●	▼	▼▼
P5 (10.05%)	N	N	●	▼▼	▼▼
P6 (5.17%)	Y	N	▲	▲	●
P7 (2.25%)	N	N	●	▼▼	▼
P8 (2.71%)	N	N	●	▲	▼▼
P9 (2.48%)	N	N	●	▲▲	▲▲
P10 (4.78%)	N	N	●	●	▼▼
P11 (0.88%)	N	N	●	▼	●
P12 (0.32%)	N	Y	●	▼	▼▼
P13 (34.72%)	N	N	▼	▼▼	▼▼
P14 (13.34%)	Y	N	●	▼	▼
P15 (4.44%)	Y	Y	●	●	▼

Table 3: Seller Profile - Clusters

Characterization & Analysis

4) Identifying seller profiles (16 groups)

– P13 (34.72%)

- Neither a retailer or a certified participant.
- Low reputation, are newcomers and present a very low amount of sales.

– P14 (13.34%)

- retailers without certification;
- Average reputation value, short registration time and small number of sales.

Characterization & Analysis

4) Identifying seller profiles (outcomes)

Seller Profile	Success Indicators				
	Price	Volume	Views	Qualification	Duration
P0	●	●	▲	▲▲	●
P1	▼▼	▲▲	▼▼	▼	▼▼
P2	▼	▼▼	●	▼	▼
P3	●	▲	●	▲	●
P4	●	●	▼	▲	●
P5	●	●	●	▲	●
P6	●	▼	▲	▲▲	▼
P7	▼	▼	▲▲	▼▼	●
P8	▲	▼	▼	▲	▼
P9	▼▼	▲▲	▼▼	▲▲	▼▼
P10	▲	▼	●	▲	●
P11	▼	▼	▲▲	▼	▼
P12	▲▲	▼▼	▼	▲▲	▲
P13	●	●	▼	●	●
P14	●	▼	▲▲	▲	▲
P15	▲	▼	▼	▲▲	▲▲

Table 4: Seller Profile - Success Indicators

Characterization & Analysis

4) Identifying seller profiles

- Some findings:
  - Small number of retailers in *TodaOferta,* who perform 25.2% of the negotiations;
  - Small number of certified sellers in *TodaOferta* and they perform a small percentage of sales (4.76%);
  - Newcomers correspond to 47.02% of all completed transactions in the e-market.

Characterization & Analysis

5) Identifying selling strategies (15 groups)

Cluster	Seller Strategies - Characteristics				
	Highlight	Price	Duration	Images	Quantity
S0 (10.12%)	Y	●	●	▲▲	●
S1 (1.96%)	N	▲▲	●	●	▼▼
S2 (6.78%)	Y	▼	▲	▲	▲▲
S3 (9.37%)	N	▼	▼	●	▼▼
S4 (4.89%)	N	●	▼	▲▲	▼
S5 (4.34%)	N	●	▲	▲▲	▼
S6 (12.83%)	Y	●	●	▼	▼
S7 (3.84%)	N	●	●	▼	▲▲
S8 (5.27%)	N	●	▼	▼	▼▼
S9 (11.88%)	N	▼▼	▼▼	▼▼	▼▼
S10 (1.55%)	N	●	●	▲▲	▲▲
S11 (11.41%)	N	▼	●	▼▼	●
S12 (6.24%)	N	▼	▲▲	▼	▼▼
S13 (3.19%)	N	▲	●	▼	▼▼
S14 (6.33%)	Y	●	▲▲	●	●

Table 5: Seller Strategy - Clusters

Characterization & Analysis

5) Identifying selling strategies (15 groups)

- S6 (12.83%)
  - Offers with highlighted advertisement;
  - Average values of price and duration;
  - Low number of product images;
  - Low quantity of items;
- S9 (11.88%)
  - No special advertisement package;
  - Very low price and duration;
  - Very small number of images and quantity of items;

Characterization & Analysis

5) Identifying selling strategies (outcomes)

Seller Strategy	Success Indicators			
	Volume	Views	Qualification	Duration
S0	●	▲	▲▲	●
S1	●	▼	▲	●
S2	▼	▲▲	▲▲	▲
S3	●	▼	●	▼
S4	●	●	●	▼
S5	●	●	▼	▲
S6	●	▲	▲▲	●
S7	▼▼	▼	●	●
S8	▲	▼▼	▲	●
S9	▲▲	▼▼	▼	▼▼
S10	▼▼	▼	●	●
S11	●	▼	●	●
S12	●	▼	▼	▲▲
S13	●	▼	▲	●
S14	●	▲	▲▲	▲▲

Table 6: Seller Strategy - Success Indicators

Characterization & Analysis

5) Identifying selling strategies

- Some findings:
  - Offers with Highlight do not necessarily sell a high volume of items, since the volume depends on the amount of offered items.
  - Using Highlight is an efficient mechanism to attract visits, as can be observed by the success indicator Views.
  - A highlighted offer is not a condition to sell faster.

Characterization & Analysis

5) Identifying selling strategies

- Some findings:
  - Offers with lower average prices (e.g., S2) would attract more visitors, however this behavior was observed only for the ones which also pay to be highlighted.
  - Different from what could be expected, a lower value for the price of an offer do not determine a lower time to sell (the same conclusion is valid for a higher value).
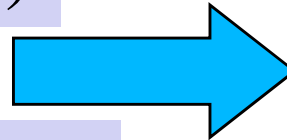
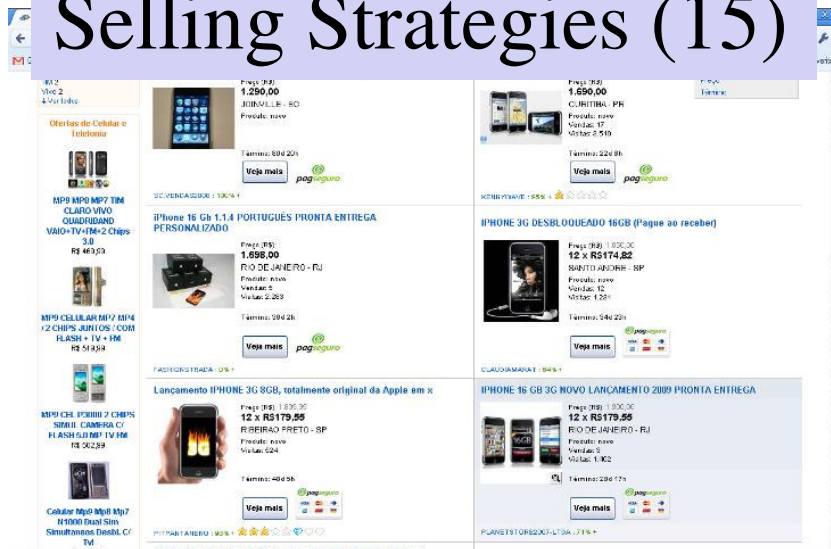# Characterization & Analysis

6) Analysis of selling practices

Seller Profiles (16)

✖

Selling Strategies (15)
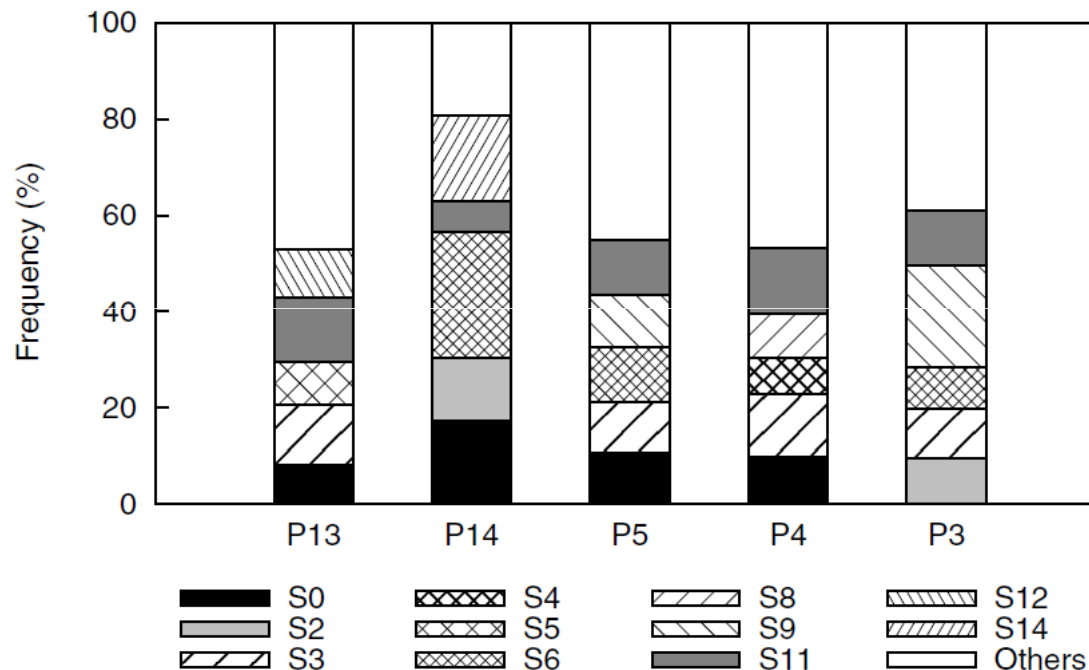
➡

Selling Practices

- 198 practices from 240 possibilities.

Characterization & Analysis

6) Analysis of selling practices

– Distribution of selling strategies (most popular seller profiles):

"Seller profiles choose different strategies to configure their offers."
(Hypothesis 1)

Characterization & Analysis

6) Analysis of selling practices

"The impact of the selling strategy on negotiation results depends on the seller profile." (Hypothesis 2)

- A given strategy may be effective to lead to good results for some profiles, but not to others.

- To evaluate it:
  - Analyze selling practices and the negotiation outcomes;
  - Qualification (Q);
  - Price (P) * Volume (V);
  - Qualification (Q) * Price (P);
  - Etc.

Characterization & Analysis

6) Analysis of selling practices

Dimensions	Selling Practices	
	Best	Worst
Qualification (Q)	P9 - S9	P11 - S12
	P6 - S4	P7 - S1
	P15 - S12	P2 - S13
	P15 - S11	P7 - S4
	P4 - S10	P11 - S4
Price (P) * Volume (V)	P1 - S13	P0 - S1
	P9 - S13	P1 - S8
	P9 - S1	P9 - S8
	P1 - S1	P15 - S10
	P4 - S1	P12 - S2
Qualification (Q) * Price (P)	P0 - S1	P2 - S13
	P3 - S1	P7 - S1
	P15 - S1	P7 - S4
	P8 - S1	P7 - S9
	P4 - S1	P7 - S11

- Despite the strategy S4 is not very good in general, it becomes a good strategy in terms of this criterion when adopted by P6.

Characterization & Analysis

6) Analysis of selling practices

Dimensions	Selling Practices	
	Best	Worst
Qualification (Q)	P9 - S9	P11 - S12
	P6 - S4	P7 - S1
	P15 - S12	P2 - S13
	P15 - S11	P7 - S4
	P4 - S10	P11 - S4
Price (P) * Volume (V)	P1 - S13	P0 - S1
	P9 - S13	P1 - S8
	P9 - S1	P9 - S8
	P1 - S1	P15 - S10
	P4 - S1	P12 - S2
Qualification (Q) * Price (P)	P0 - S1	P2 - S13
	P3 - S1	P7 - S1
	P15 - S1	P7 - S4
	P8 - S1	P7 - S9
	P4 - S1	P7 - S11

- Idea of profit / unit.
- S1: good results in this analysis - very high prices to sell very low quantities, probably a unique item.
- P0-S1: not good, since P0 achieves average price and volume (group of retailers who offers many items).

Characterization & Analysis

6) Analysis of selling practices

Dimensions	Selling Practices	
	Best	Worst
Qualification (Q)	P9 - S9	P11 - S12
	P6 - S4	P7 - S1
	P15 - S12	P2 - S13
	P15 - S11	P7 - S4
	P4 - S10	P11 - S4
Price (P) * Volume (V)	P1 - S13	P0 - S1
	P9 - S13	P1 - S8
	P9 - S1	P9 - S8
	P1 - S1	P15 - S10
	P4 - S1	P12 - S2
Qualification (Q) * Price (P)	P0 - S1	P2 - S13
	P3 - S1	P7 - S1
	P15 - S1	P7 - S4
	P8 - S1	P7 - S9
	P4 - S1	P7 - S11

- <u>S1</u>: the best practice when used by P0, P3, P15, P8 and P4 (seller with higher average reputation).
- And a <u>worst practice</u> when adopted by <u>P7</u> (<u>newcomers</u> that achieve <u>low prices</u> with <u>very low transaction qualification</u>).
- <u>P7</u>: worst practices.

Characterization & Analysis

6) Analysis of selling practices

> "The impact of the selling strategy on negotiation results depends on the seller profile." (Hypothesis 2)

– Best and worst seller practices: confirm our second hypothesis;

Characterization & Analysis

6) Analysis of selling practices

– Ten most frequent practices (31.78%);

– In general: not good practices:

• Motivates decision support tools for sellers.

Practice (%)	Most Frequent						
	V	Q	D	P*V	V/Views	Q*P	D*P
P13-S11(4.78)	●	▼	●	▼	▼	▼	●
P13-S3 (4.35)	●	▼	●	▼	▼	▼	▼
P14-S6 (3.50)	●	▲	●	●	▼	●	●
P13-S12 (3.41)	●	▼	▲	▼	▼	▼	●
P13-S5 (3.01)	●	▼	▲	▼	▼	●	●
P13-S0 (2.81)	▼	▲	●	▼	▼▼	●	●
P13-S9 (2.59)	▲	▼	▼	●	●	▼	▼▼
P1-S9 (2.50)	▲▲	▼	▼▼	▼▼	▲	▼▼	▼▼
P9-S9 (2.48)	▲▲	▲▲	▼▼	▼▼	▲	▼	▼▼
P14-S14 (2.35)	▼	▲	▲▲	▼	▼▼	●	▲

Table 8: Most Popular Selling Practices

Comparative Analysis

- ## <u>Auction x Fixed-price</u>

    – The thrill and novelty of auctions have given way to the convenience of one-click purchases (*BusinessWeek, jun 2008);*

    – Sales at Amazon.com (the leader in online sales of fixed-price goods) rose 37% in the first quarter of 2008. At eBay, where auctions make up 58% of the site's sales, revenue rose 14%.

    – In Brazil (cultural factor?): online auctions have not been popular.

    - *TodaOferta* marketplace: 98.2% of fixed-price.

Comparative Analysis

- ## <u>Newcomer sellers</u>

  – eBay marketplace: a large number of newcomer sellers, with heterogeneous characteristics who tried a wide range of strategies.

  – Our research: similar conclusion - the newest sellers of *TodaOferta try a variety of* selling strategies.

  – Moreover: newcomers from *TodaOferta present different* characteristics and distinct success indicators in their negotiations.

Comparative Analysis

- ## Qualified sellers

  - how seller reputation rating affects the negotiation outcomes, such as final prices?

  - Seller reputation, as measured by eBay, did not appear as significant in determining the final price (related work).

  - Different from their conclusions: we found out that reputation rating has a significant impact on negotiation outcomes.

    - However this fact can not be analyzed separately (also depends on selling strategy).

Conclusion & Ongoing Work

- Analysis of selling practices in a Brazilian marketplace, considering seller profiles and selling strategies;

- Investigate and confirm 2 hypotheses:

  - "Seller profiles choose different strategies to configure their offers;

  - "The impact of the selling strategy on negotiation results depends on the seller profile".

Conclusion & Ongoing Work

- Some interesting findings:
  - Small number of retailers in *TodaOferta and* also a small percentage of negotiations performed by them (25.2%);
  - Newcomers correspond to 47.02% of all complete transactions in the e-market (*TodaOferta has been growing* each day);

Conclusion & Ongoing Work

- **Some interesting findings:**
  - Highlight offer:
    - an efficient mechanism to attract visits;
    - not a condition to sell faster.
  - These conclusions illustrate how complex are this e-market interactions.
- **Comparative analysis with worldwide popular marketplaces:**
  - Similar and different aspects.

Conclusion & Ongoing Work

- Ongoing work: investigate with more details the selling practices, considering the <u>top product categories</u>.

- Perform a similar characterization to <u>offers that do not result in sale</u>, comparing the results.

- Characterize and analyze the <u>buyer profiles</u>, investigating the <u>buying practices</u>.

- The current and future results can be applied to develop mechanisms to provide <u>decision support tools</u> to <u>recommend negotiation practices</u> to sellers and buyers.

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That's the end…

Thank You