Taxonomy of E-commerce Disputes

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Abstract:- An e-commerce transaction is a means to perform particular commercial activities using the global digital e-commerce infrastructure. In this paper we are concentrating on business to customer (B-to-C) e-commerce transactions. Using electronic means to do business can greatly improve the efficiency of the business transactions. However it creates some problems that were rarely considered to be important before. One class of problems results from the behaviour of untrustworthy participants. For reasons such as dishonesty and network failure, disputes may arise. Online alternative dispute resolutions (online-ADR or ODR) have been heavily researched but none have tried to identify what the possible disputes have been to then make sure that any ODR is a complete solution. In this paper, we try to classify disputes according to all the factors of the transactions in which the disputes have arisen. To this end, we first classify them according to their causes and go on to provide a formal method of proving the validity of our results. This paper would be a good first read for anyone who wants to work in the ODR field.

Key-Words:- E-commerce, dispute, Dispute taxonomy, customer, merchant, transaction

1- Introduction

E-commerce now constitutes a significant part of all commercial activity. As a result there are now many more transactions which inevitably means more dispute cases. Most of the work in the literature concentrates on the exchange of the two items(money and goods) so what they are trying to solve is based on only one problem.

This problem of making sure that the exchange is fair concentrates on the possiblity of one party receiving something and not sending what was promised in exchange..

We are trying in this paper to create a taxonomy of the dispute cases, taking into account all possible scenarious that might happen. We do not claim completeness, but we have tried to study the situation from different perspectives: computer science, business, legal, and that of the transaction participants , i.e. The customer and the merchant.

Online Dispute Resolution (ODR) describes new methods of dispute resolution where most of which is provided online. Most ODR services are alternatives to litigation and to state justice. In this sense, they are the online transposition of the methods developed in the Alternative Dispute Resolution (ADR) movement, which are mainly negotiation, mediation, and arbitration. But there are also projects of proper online courts, which are really normal court which simply communicate essentially online [8].

For most consumer e-commerce disputes the cost of legal redress by litigation is not proportionate to the value of the claim. Therefore, for such claims cost-effective Online Dispute Resolution (ODR) schemes are the only viable means of redress [7].

We seeks to understand the nature of the online environment and how this environment affects disputes and dispute resolution. Disputes and dispute resolution do not occur in a vacuum. Every dispute arises in a setting or context, and the setting from which it arises may shape the expectations of the parties, the timing of settlement, the perceived urgency of resolution, the consequences of and available alternatives to failure, the role of the third party, and even the form of dispute resolution[1].

We start this paper by giving a brief definition of dispute, then we list the assumptions, notations and the transaction elements we used to clarify the taxonomy. After that, we try to formally list all possible disputes using 'truth table' approach. Then the taxonomy of the disputes in e-commerce is illustrated. We finish with a conclusion and possible directions for future research.

2- Disputes

Disputes and complaints are two words that are frequently being used interchangeably without providing any definition or context. There are various types of damaging or injurious experiences that consumers may have. Commentators often refer to a'pyramid of injurious experience' or a 'dispute pyramid' [9]. At the base of the pyramid is Unperceived injurious experience, moving up to perceived harms, grievances and complaints. At the very top of the pyramid, forming the smallest category, are disputes with a subset being disputes voiced to third parties and pursued through formal dispute resolution which would include ADR as well as lawsuits.

The layers of the dispute pyramid have been characterized in the following manner[2]:

Unperceived injurious experience. Consumers may experience a problem with a transaction but never perceive it as injurious per se. For example, a consumer may lack the expertise to recognize a specific problem such as a product defect that makes a product work inefficiently.

Perceived injurious experience. Out of the larger mass of experience, some of it is perceived by individuals as injurious. A consumer or customer, however, may blame him or herself or feel that the injury is too vague or debatable to be susceptible to a remedy. Thus, the experience may never develop into a grievance.

Grievances. A grievance is a sense of violation of a right or entitlement that can be ascribed to a specific person or entity. Grievances are usually not voiced, although they may make customers decide not to return to a particular merchant or type of merchant or medium. For example, a consumer who has a grievance arising out of an Internet transaction may choose never to use the Internet for future purchases. When a grievance is not voiced the consumer, in essence, absorbs the loss.

Complaints or claims (not legal claims or complaints). A complaint is a grievance that is voiced to the perceived offending party. Most frequently, complaints are granted or redressed. These would be referred to as "resolved" complaints. Reputable merchants, who seek repeat business and value positive reputation among consumers will encourage customers who perceive grievances to complain. A merchant who receives a complaint is in a position to grant relief and to satisfy the customer. Granting relief builds trust and confidence with the customer for future dealings.

Disputes. A dispute, as contrasted with a complaint, is a complaint that has been rejected in whole or in part. Often, customers do nothing after a complaint has been rejected by a merchant. This is another stage at which consumers may choose to absorb or internalize the loss.

This is often rational because the cost of pursuing relief may be more expensive than the loss itself. The customer, however, may choose to avoid future dealing with the merchant and can create negative feedback or word of mouth.

Disputes voiced to a third party. A small fraction of customers with disputes choose not to give up but to seek the assistance of some third party. Third parties might include a government agency, a merchant association or a lawyer. Not infrequently, the third party will advise a consumer that it is not worth it to commence a formal proceeding against a merchant.

Formal dispute resolution would include ADR or lawsuits. This is the top of the pyramid and the smallest category on the dispute pyramid.

In this paper we will concentrate on Disputes in general.
In this section we will talk about the possible causes of disputes.
All disputes are about one of the three main elements of any transaction. Product/service, payment and the exchange of the two. Products and services are almost the same in ecommerce, and these products could be delivered physically like a notebook computer, electronically like a piece of audio or video, or over time such as an Internet or online magazine subscription. Payments in ecommerce are more complicated than normal commerce since in normal commerce almost all the transactions are conducted using either, cash, cheques, credit cards, debit cards, or wire transfer. In e-commerce, whilst all the above are applicable many other new payment systems, e.g. E-cash, e-coin, paypal now exist. Complications arising from the introduction of new payment systems are frequent and the new payment systems can take a long time to become established. In contrast the original five methods cited are

tried and tested. Exchange of goods and payment in e-commerce is also a major contributor to the causes of disputes since the exchange may take more than one form depending on the product purchased and the payment method used.

In this paper we will talk about dispute cases in general and not be specific about any goods, payment or exchange method. i.e, if the credit card is not valid we will only describe this as "payment quality is not good" and will not consider the reason: whether it had expired, was not yet valid, whether the expiry date did not match or it had been stolen.

3- Assumptions, Notations and the Transaction Elements

3.1 Assumptions: In this section we will list some of the assumptions which will make it easier for us to give a clear and general taxonomy for E-commerce disputes.
A1: a payment is a payment whatever form it takes (with no particular concern for specific forms);

A2: payment is actually a special Item which a Party wants to exchange with another party for another Item - which might be payment too;

A3: all disputes will occur after one of the two parties involved in the transaction delivers the Item;

A4: if an Item was delivered to the wrong address or could not be delivered because a wrong address was supplied, we consider that the item had been delivered but that the delivery address was incorrect (since the sender already tried to send it).

3.2 Notations: We will list here the notations we used in this paper and that will be used in any forthcoming publication.

Px : Party x who wants to exchange something with Party **Y**.

Ix : Item that Px wants to exchange.

Qx: Quality of the item Ix.

Cx: Number of Items Ix that Px wants to exchange in a single transaction.

Ax: Delivery Address of P**Y** where he wants P**X** to send I**X** to.

Tx: Time interval where Px will deliver his Ix to P**Y** within**.**

Dx: Actual Delivery of Ix by Px to P**Y**

Sx: Satisfaction level Px promises P**Y**

Mx: consumption of I**Y** by Px

3.3 Transaction Elements : Any E-commerce transaction will go through the following three steps

    1- Order and Negotiation
    In this stage Px and PY will negotiate and agree on the following :
    (Px, Ix, Qx, Cx, Ax, Tx) and (P**Y**, I**Y**, Q**Y**, C**Y**, A**Y**, T**Y**)

    2- Actual Exchange
    In this stage Dx and D**Y** will take place

    3- Post Transaction
    In this stage both Px and P**Y** can generate (Sx, Mx) and (S**Y**, M**Y**) respectively.

4- Proof of Completeness

In order for us to make sure that we cover all the possible dispute cases, we should generate the Truth Table for it and study all the possibilities.
Each party involved in the transaction have nine attributes (Px, Ix, Qx, Cx, Ax, Tx, Dx, Sx, Mx) and we only study the transactions between two parties, eighteen attributes- nine for each- will be used to generate the Table.

For each attribute it will take the value of True or false if the desired action was completed successfully or unsuccessfully respectively (e.g. Ix is true if the party involved in the transaction Px agree that Ix is the item he ordered and it will be false if he claims that Ix is not what he ordered) and so on for the rest of the attributes.

Eighteen feature mean that the size of the table will be 2^{18} = 262144 tuples

Since it is quite long and time consuming to generate the whole table we tried to minimize as much as possible without sacrificing any aspect of the truth table.

We will start with the actual delivery D since it is a critical feature and since the sequence of features in the Table will not affect the result.

DA	DB	PA	PB	IA	IB	QA	QB	CA	CB	AA	AB	TA	TB	SA	SB	MA	MB	Success
T	T																	?
T	F																	NO
F	T																	NO
F	F																	YES

From the table we can see that if either of the two parties involved deliver and the other not (T F or F T) then the success will be "NO" meaning that no hope for this transaction to be successful since for sure one party will dispute. This mean that 50% of the possibilities is for sure disputes.

we can see that if (D_A and D_B) are FALSE then success will be "YES" meaning there could be no possible disputes at all since no exchange happen – assumption A3. this will take 25% of the table making the remaining only 25% which we don't know is it a success or not.

We can see that 131072 are disputes regardless of the others which means (D_A or D_B) and 65536 are successful transactions since ($\neg D_A$ and $\neg D_B$) .

We end up with 65536 possibilities to check

DA	DB	PA	PB	IA	IB	QA	QB	CA	CB	AA	AB	TA	TB	SA	SB	MA	MB	Success
T	T	T	T															?
T	T	T	F															NO
T	T	F	T															NO
T	T	F	F															NO

From the 65536 we find out that 49152 are disputes regardless of the rest which means if (P_A) or (P_B) is FALSE (i.e., either of the two parties or both deny participating) it will result in a dispute.
We end up with 16384 possibilities to check

DA	DB	PA	PB	IA	IB	QA	QB	CA	CB	AA	AB	TA	TB	SA	SB	MA	MB	Success
T	T	T	T	T	T													?
T	T	T	T	T	F													NO
T	T	T	T	F	T													NO
T	T	T	T	F	F													NO

From the 16384 we find out that 12288 are disputes regardless of the rest which means if (I_A) or (I_B) is FALSE (i.e., either of the two parties or both claim that the item received is not what he agree with the other) it will result in a dispute
We end up with 4096 possibilities to check

DA	DB	PA	PB	IA	IB	QA	QB	CA	CB	AA	AB	TA	TB	SA	SB	MA	MB	Success
T	T	T	T	T	T	T	T											?
T	T	T	T	T	T	T	F											NO
T	T	T	T	T	T	F	T											NO
T	T	T	T	T	T	F	F											NO

From the 4096 we find out that 3072 are disputes regardless of the rest which means if (Q_A) or (Q_B) is FALSE (i.e., either of the two parties or both claim that the quality of the item received is not what both agreed on) it will result in a dispute
We end up with 1024 possibilities to check

D_A	D_B	P_A	P_B	I_A	I_B	Q_A	Q_B	C_A	C_B	A_A	A_B	T_A	T_B	S_A	S_B	M_A	M_B	Success
T	T	T	T	T	T	T	T	T	T									?
T	T	T	T	T	T	T	T	T	F									NO
T	T	T	T	T	T	T	T	F	T									NO
T	T	T	T	T	T	T	T	F	F									NO

From the 1024 we find out that 768 are disputes regardless of the rest which means if (C_A) or (C_B) is FALSE (i.e., either of the two parties or both claim that the quantity of items received is not what they agreed on) it will result in a dispute.
We end up with 256 possibilities to check

D_A	D_B	P_A	P_B	I_A	I_B	Q_A	Q_B	C_A	C_B	A_A	A_B	T_A	T_B	S_A	S_B	M_A	M_B	Success
T	T	T	T	T	T	T	T	T	T	T	T							?
T	T	T	T	T	T	T	T	T	T	T	F							NO
T	T	T	T	T	T	T	T	T	T	F	T							NO
T	T	T	T	T	T	T	T	T	T	F	F							NO

From the 256 we find out that 192 are disputes regardless of the rest which means if (A_A) or (A_B) is FALSE (i.e., either of the two parties or both claim that the delivery address of the other party is not correct and that why the item was not delivered to him) it will result in disputes
We end up with 64 possibilities to check

D_A	D_B	P_A	P_B	I_A	I_B	Q_A	Q_B	C_A	C_B	A_A	A_B	T_A	T_B	S_A	S_B	M_A	M_B	Success
T	T	T	T	T	T	T	T	T	T	T	T	T	T					?
T	T	T	T	T	T	T	T	T	T	T	T	T	F					NO
T	T	T	T	T	T	T	T	T	T	T	T	F	T					NO
T	T	T	T	T	T	T	T	T	T	T	T	F	F					NO

From the 64 we find out that 48 are disputes regardless of the rest which means if (T_A) or (T_B) is FALSE (i.e., either of the two parties or both claim that the item he expect does not arrive on the time agreed) it will result in a dispute.
We end up with 16 possibilities to check

D_A	D_B	P_A	P_B	I_A	I_B	Q_A	Q_B	C_A	C_B	A_A	A_B	T_A	T_B	S_A	S_B	M_A	M_B	Success
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T			?
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	F			NO
T	T	T	T	T	T	T	T	T	T	T	T	T	T	F	T			NO
T	T	T	T	T	T	T	T	T	T	T	T	T	T	F	F			NO

From the 16 we find out that 12 are disputes regardless of the rest which means if (S_A) or (S_B) is FALSE (either of the two parties or both CLAIM that he is not satisfied with the item received) it will result in a dispute.
We end up with 4 possibilities to check

D$_A$	D$_B$	P$_A$	P$_B$	I$_A$	I$_B$	Q$_A$	Q$_B$	C$_A$	C$_B$	A$_A$	A$_B$	T$_A$	T$_B$	S$_A$	S$_B$	M$_A$	M$_B$	Success
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	Yes
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	F	NO
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	F	T	NO
T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	F	F	NO

Out of the 4 we find out that 3 are disputes regardless of the rest which means if (M$_A$) or (M$_B$) is FALSE (i.e., either of the two parties or both claim that the other one consume his item more than what they agreed on) it will result in a dispute.

So we end up with 1 case with no dispute which is when all the values are True

We end up with the success formula as
Success ={(¬Dx&¬Dy) or ((Dx&Dy) & Px & Py & Ix & Iy & Qx & Qy & Cx & Cy & Ax & Ay & Tx & Ty & Sx &Sy & Mx & My)} where x and y ? { a, b} and x? y

Which means that a dispute formula should be ¬success which means Dispute transaction DT={ (Dx xor Dy) or ¬Px or ¬Py or ¬Ix or ¬Iy or ¬Qx or ¬Qy or ¬Cx or ¬Cy or ¬Ax or ¬Ay or ¬Tx or ¬Ty or ¬Sx or ¬Sy or ¬Mx or ¬My} where x and y ? { a, b} and x? y

5- Taxonomy

In this section we list all the possible disputes causes and below, for every cause we list the possible dispute reason. There are two important points to clarify: first, in one transaction there could be more than one dispute case because one party will dispute and then the other will dispute the dispute and so on, until a final dispute resolution is achieved. In our classification we consider each dispute a case and we treat them separately. Second, in one dispute there could be more than one cause. In our classification we concentrate on the causes so we will not take this in consideration and we treat them separately [3,4,5,6,10,11].

We assume that Party X wants to buy something from Party Y

5.1-Delivery: In this one we gathered all dispute reasons that caused by a problem of delivery

a. Payment received but goods not delivered (Dx & ¬Dy)
    This is a clear case and no need for more clarification.

b. Goods received but payment not delivered (Dy & ¬Dx)
    This is a clear case and no need for more clarification.

c. Goods not delivered on time (¬Ty)
    In this type a dispute may occur because the goods were delivered on time. E-tickets have no value after the flight time, so if an e-ticket received late then this is a good reason to dispute the transaction.

d. Payment not delivered on time (¬Tx)
    In this type a dispute may arise because the payment was not delivered on time. Late payment may result in financial penalty on the merchant and he may have to pay an interest in such cases, so if the payment is received late, this would be a good reason to dispute the transaction.

e. Goods Can not be delivered (¬Ax)
    In this type the goods cannot be delivered for any reason that has been caused by the customer, for example, a wrong address or and invalid email. If goods cannot be delivered because of the merchant then this is Dispute{1-a} above and the reason for non-delivery is not important.

Disputes may arise from both sides, the customer could claim he never received the goods and asked for a credit to what was paid. However this is not considered here because it is the same dispute as Dispute{1-a}. The merchant might dispute because crediting a customer could mean a chargeback for which he will have to pay a fee (and it could also be considered as bad credit for his merchant account). So his dispute could claim that the customer caused the mistake by providing the wrong delivery address, and if any was payable then it shold be the customer's responsibility. In this case the merchant would have good reason for the dispute.

f. Payment Can not be delivered $(\neg Ay)$

In this type the payment can not be delivered for reasons caused by the merchant e.g. a wrong account number or revoked key. If payment cannot be delivered because of the customer then this is Dispute{1-b} above. Dispute may be caused by both parties, the merchant may claim he never received the payment and may ask for his goods to be returned at the customer's expense or for the late payment penalty to be made by the customer and not himself. However this is not considered here because it is the same dispute as Dispute{1-b}. The customer may cause a dispute claiming that he should not be held responsible for returning the goods or making the penalty payment since it would constitute extra expense and the fault was the merchant's for providing a wrong account number, therefore any fee should be paid by the merchant. In this case the customer would have a good reason to create a dispute.

5.2- Order: This is a compilation of all of all dispute reasons connected with the order or the transaction itself.

a. Customer claims never placing the order $(\neg Px)$

In this type of dispute the customer is charged for a transaction and he claims that he never placed, whether the goods were delivered or not is not part of the

issue, what matters is whether or not the order was placed.

b. Merchant claims no order made $(\neg Py)$

In this type of dispute the merchant is held responsible for a transaction but claims that he never received it. Whether payment was or was not delivered is not the issue, what is of concern is whether or not the merchant received the order. A possible scenario is a customer who is buying an E-ticket, if the customer loses any money because of the merchant not delivering the E-tickets and the customer subsequently wants compensation – this could be part of Dispute{1-b}- then the merchant will dispute this saying that he never received such an order.

c. ORDER quantity is not correct $(\neg Cy)$

In this type both the customer and the merchant may dispute things by claiming the quantity ordered was respectively less or more than what was ordered.

d. AMOUNT PAID INCORRECT $(\neg Cx)$

In this type both the customer and the merchant may make a dispute by claiming that the payment amount was respectively more or less than the value of what has been ordered.

5.3- Item

a. Received goods not as Purchased $(\neg Iy)$

This is a common dispute reason where the customer ordered something and then received something completely different. A straight forward example might be when a customer ordered a video about World War I and received a video about The World Cup.

b. Received money not as sold $(\neg Ix)$

This usually happen when transaction conducted between cross border parties, the merchant approves an order worth of 200 Pounds and the customer transfers 200 US Dollars. We should distinguish here between this type and Dispute{2-d} because here the customer is claiming that he is purchasing something worth 200 US Dollars while in Dispute{2-d} there is no disagreement on the price but the

customer is paying less than what is agreed for whatever reason.

c. *Quality of Received goods not as promised(¬Qy)*

In this type the customer disputes a transaction because he claims that what he has been promised has not been delivered. For example, if it is something physical it could be damaged, if a video it could have bad picture or other quality problems.

d. *Money quality not proper(¬Qx)*

In this type the merchant dispute a transaction because he claims that what he has been promised as payment has not been delivered. It could be in the form of counterfeit money, an expired credit card, or any other payment quality problem.

e. *Received goods not as expected(¬Sx)*

This type of dispute is considered one of the hardest to resolve since satisfaction can not be measured. The customer will claim that what he received was not what was expected when placing the order.

f. *Received money not as expected(¬Sy)*

The merchant will claim that what he received as payment is not what expected when approving the order.

g. *Multiple Payment consumption (¬My)*

This could happen because of using different payment methods at the same time for example paying by a credit card and because it was not approved on time then another payment method is used, for example a cheque. after the cheque has been processed, approval for the credit card transaction might subsequently arrive. This type of situation might also arise due to the use of a self approved payment method such as a credit card where the merchant can charge a card without the approval of the customer, or e-cash is used where the customer only signs the e-cash with his private key but there is nothing to stop the merchant from submitting the e-cash more than once. Whilst thee are other possible reasons, the major concern here is one of multible charging from the point of view of the consumer.

h. *Multiple Goods consumption (¬Mx)*

This type of dispute is rare but still possible. One example is where a customer might order one notebook but the merchant sends two notebooks against the same order but only charges the customer once, also in pay-per-preview movies a customer may watch the movie twice and charged only once.

6- Conclusion and Future Research

In this work we have proposed the first taxonomy for dispute cases in e-commerce. Our taxonomy was created using actual case study evidence personal experience in this field. We tried to make the taxonomy general so that it does not depend on any payment method used or product purchased. People may find cases where they think our taxonomy does not apply because it does not define their particular reason for dispute, e.g. when a customer might write a cheque and have no balance in the account to cover the amount. On the first sight this may seem a case we did not mull over but on further examination of the dispute reason, category {3-d} Money quality not proper(¬Qx) could be used to explain the situation.

Our work has been limited by a number of assumptions. future work will try to study each reason separately in order to minimise these as much as possible. at the same time the intention is to provide more detailed proposals as to solutions for prevention or resolution of the conflict.

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