YELLEVATE YOUR SETTLEMENTS

WITH

Team D.A.emon Targaryen

Group 2

An in-depth report on the company's Sales performance from the fiscal year 2020 to 2021.

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COHORT #22A

Introduction of the study:

A group of students will demonstrate their data analytics skills with the use of Excel and SQL. It's a 3-weeks project challenge. During this time, they will apply everything they've learned up to now in a project that emulates a real data analytics case.

A team of approximately 6 people will become data analysts at Yellevate, an American marketing service company. This is the first time at Refocus that the students will be asked to solve a complex case that real companies face. They will work on the Yellevate case and study with Refocus mentors and teachers as they have already done for the previous assignments.

They also have something exciting lined up in the future. Their upcoming projects of this scale will involve real companies: They will be provided with their existing data and asked to solve real problems. Not only that, but they will also get direct feedback on their results from the data analytics experts that work at this company. It is a huge chance for them to prove that they are ready to take their data analytics skill set to a professional work environment.

Before that happens, let's focus on the task at hand. Yellevate has run into problems with its clients that are costing them millions of dollars. It's up to the team to get to the bottom of the problem and come up with ways to solve it.

Background of the study:

Yellevate is a company that uses data analytics to keep track of how well it helps companies improve their marketing operations. The data analytics team was approached by the company's top management to solve a lingering problem that the company has faced over the last few years.

Yellevate has been struggling with customer disputes and has been a huge financial burden for the company, more specifically with payment opt-outs with customers refusing to pay for the services which have led to an approximate 5% annual loss of revenue. Yellevate classifies such conflicts as disputes.

So far, Yellevate collected rich data about the disputes, but they couldn't dig into enough to identify the root of the issue. Yellevate asked the team to process this data and investigate the issue. The D.A. team needs to figure out what's the problem with these disputes and offer concrete strategies to eliminate them.

This issue costs the company millions of dollars, so Yellevate hopes the team understands the importance of this task. They expect that team D.A. will report the result of the investigation in 3 weeks' time to Yellevate.

Statement of the Problem:

This study is to identify the cause of clients' disputes that leads to nearly 20% of invoice settlements and to investigate the approximate 5% of revenue drop from clients' dispute lost.

Objectives of the study:

To obtain the following information and to identify the circumstances around the dispute problem.

- ✓ The rate at which the processing time is completely settled.
- ✓ The average rate at which the company reconciles disputes.
- ✓ The percentage of lost revenue and the percentage the company has lost due to customers' nonpayment.
- ✓ Identify the country where the company has reached the highest revenue loss from customer nonpayment.

Methodology:

Understanding the problem: The most important part of solving any problem is understanding it. Asking the following questions below:

- ✓ What are we looking for?
- ✓ What are the unknowns?
- ✓ Do we understand every word and concept in the problem?
- ✓ Are we familiar with the units in which measurements are given, and the terms they used?
- ✓ Is there information that seems missing?
- ✓ Is there information that seems superfluous?
- ✓ Is the source of the information bona fide / legit?

Strategizing: Now that we think we understand the problem, we choose a strategy or a set of strategies to try to solve the problem. Such as:

- ✓ Logical reasoning
- ✓ Pattern recognition
- ✓ Working backward
- ✓ Adopting a different point of view
- ✓ Considering extreme cases
- ✓ Solving a simpler analogous problem
- ✓ Organizing data
- ✓ Making a visual representation
- ✓ Accounting for all possibilities
- ✓ Intelligent guessing and testing

Implementing: We now implement our strategy or set of strategies. As we progress, we check our reasoning and computations (if any). Many novice problem-solvers make the mistake of "doing something" before understanding (or at least thinking they understand) the problem. For instance, if you ask them "What are you looking for?", they might not be able to answer. Certainly, it is possible to have an incorrect understanding of the problem, but that is different from not even realizing that we must understand the problem before we attempt to solve it!

Processed data files in SQL, Excel, visualization, and insights.

1) Processing time in which invoices are settled (average # of days rounded to a whole number).

```sql
--- 1)  processing time in which invoices are settled
---     (average # of days rounded to a whole number).

SELECT  country,
        ROUND(MIN(days_settled),0) AS min_processing_time,
        ROUND(AVG(days_settled),0) AS avg_processing_time,
        ROUND(MAX(days_settled),0) AS max_processing_time
FROM yellevate_invoices
GROUP BY country
ORDER BY country;

SELECT ROUND(AVG(settled_date - invoice_date),0)  AS avg_processing_time
FROM yellevate_invoices;
```

5 rows returned

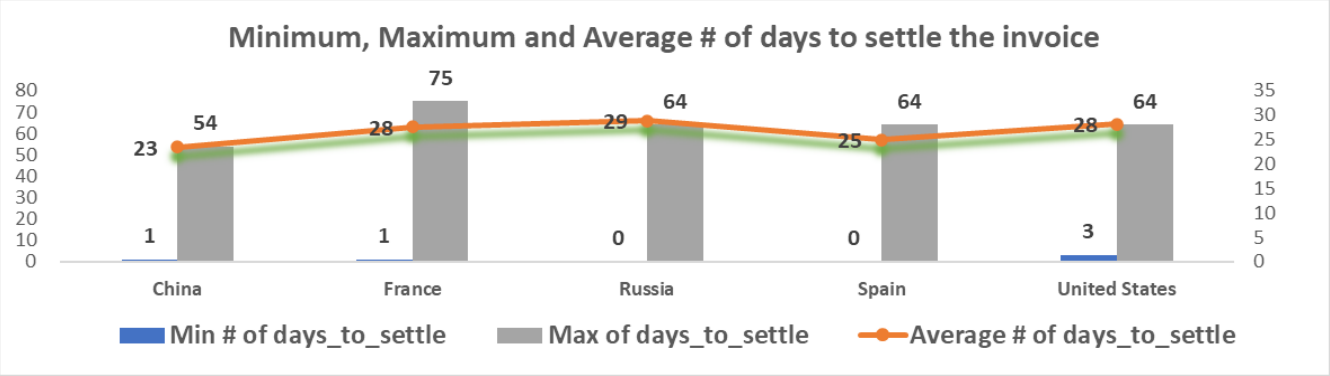
	country character varying	min_processing_time numeric	avg_processing_time numeric	max_processing_time numeric
1	China	1	23	54
2	France	1	28	75
3	Russia	0	29	64
4	Spain	0	25	64
5	United States	3	28	64

1 row returned

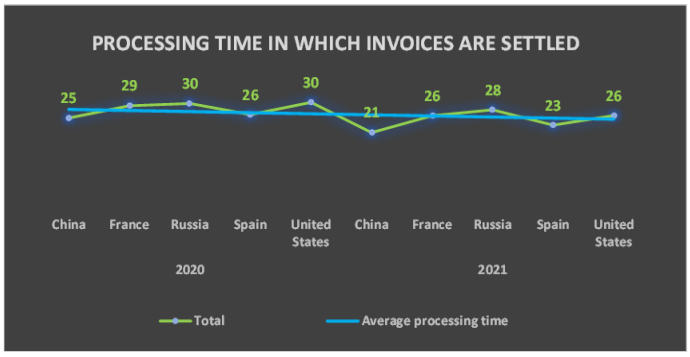
	avg_processing_time numeric
1	26

disputed	(All)

country	Min # of days_to_settle	Average # of days_to_settle	Max of days_to_settle
China	1	23	54
France	1	28	75
Russia	0	29	64
Spain	0	25	64
United States	3	28	64
Grand Total	**0**	**26**	**75**



country	Average # of days_to_settle
2020	**28**
China	25
France	29
Russia	30
Spain	26
United States	30
2021	**25**
China	21
France	26
Russia	28
Spain	23
United States	26
Grand Total	**26**



The overall average processing time to settle all invoices from 2020 to 2021 **is within 26 days**. Both with and without disputes.

2) The processing time for the company to settle disputes (average # of days rounded to a whole number).

```
--- 2) The processing time for the company to settle disputes
--- (average # of days rounded to a whole number).

SELECT  country,
        ROUND(MIN(days_settled),0) AS min_proc_time_w_disputes,
        ROUND(AVG(days_settled),0) AS avg_proc_time_w_disputes,
        ROUND(MAX(days_settled),0) AS max_proc_time_w_disputes
FROM yellevate_invoices
WHERE disputed = 1
GROUP BY country
ORDER BY country;

SELECT round(avg(days_settled),0) AS avg_days_settled
FROM yellevate_invoices
WHERE disputed = 1;
```

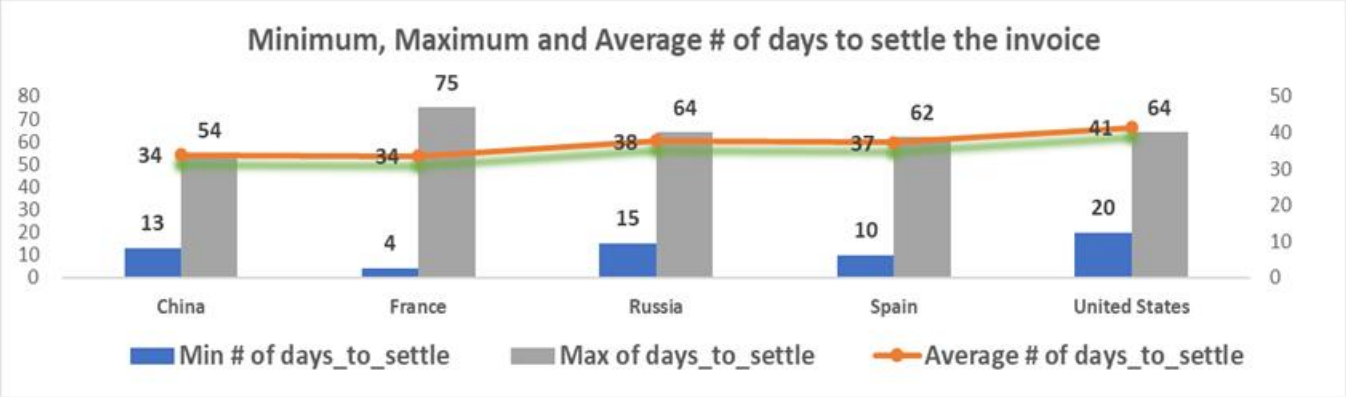
	country character varying	min_proc_time_w_disputes numeric	avg_proc_time_w_disputes numeric	max_proc_time_w_disputes numeric
1	China	13	34	54
2	France	4	34	75
3	Russia	15	38	64
4	Spain	10	37	62
5	United States	20	41	64

1 row returned

	avg_days_settled numeric
1	36

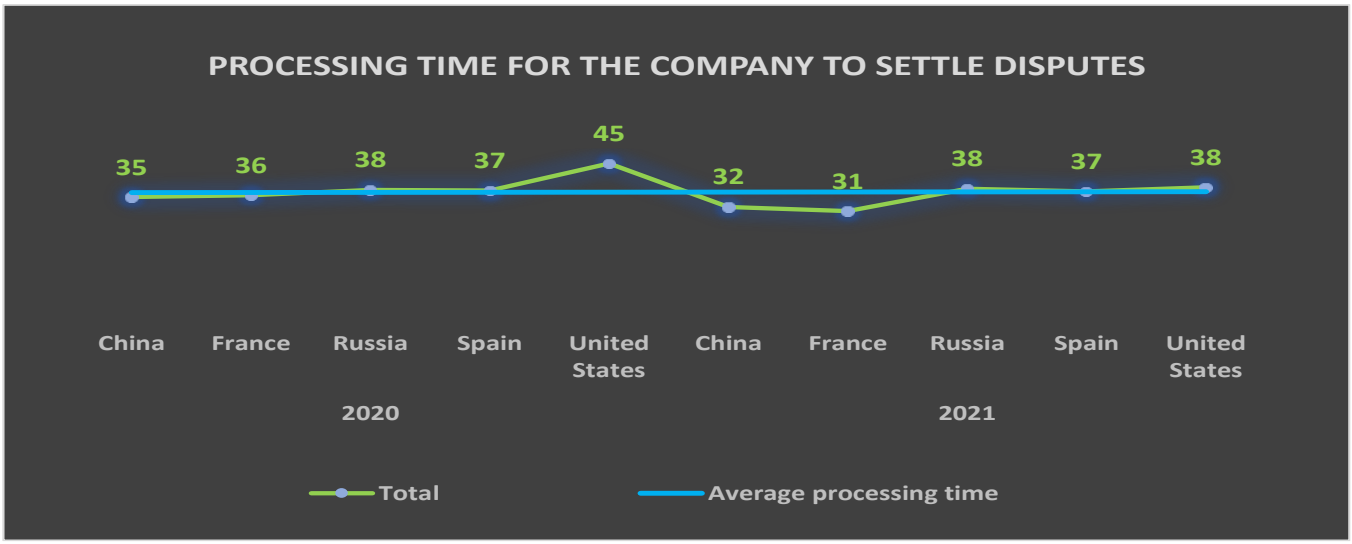
disputed	1

country	Min # of days_to_settle	Average # of days_to_settle	Max of days_to_settle
China	13	34	54
France	4	34	75
Russia	15	38	64
Spain	10	37	62
United States	20	41	64
Grand Total	**4**	**36**	**75**



disputed	1

country	Average # of days_to_settle
2020	**38**
China	35
France	36
Russia	38
Spain	37
United States	45
2021	**35**
China	32
France	31
Russia	38
Spain	37
United States	38
Grand Total	**36**



The overall average processing time to settle invoices that have disputes **is within 34 days**.

3) Percentage of disputes received by the companies that were lost (within two decimal places).

```sql
--- 3) Percentage of disputes received by the company that were lost
--- (within two decimal places)

SELECT  country,
        SUM(disputed) AS Sum_of_Disputed,
        SUM(dispute_lost) AS Sum_of_Dispute_lost,
        ROUND(SUM(dispute_lost) / SUM(disputed),2) AS Percetage_of_Lost
FROM yellevate_invoices
WHERE disputed = 1
GROUP BY country, disputed
ORDER BY Sum_of_disputed ASC;

SELECT ROUND(SUM(dispute_lost)/SUM(disputed) * 100,2) AS Percentage_of_dispute_lost
FROM yellevate_invoices;
```

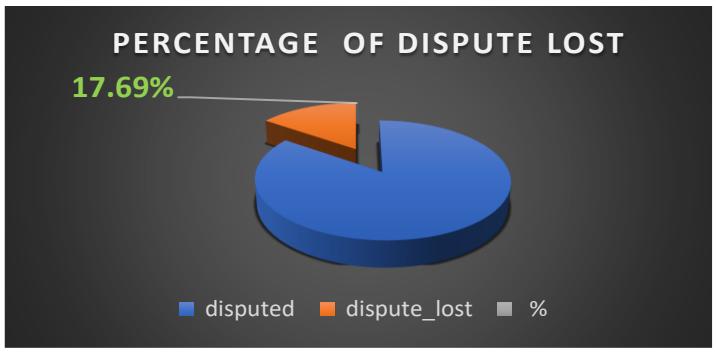
5 rows returned

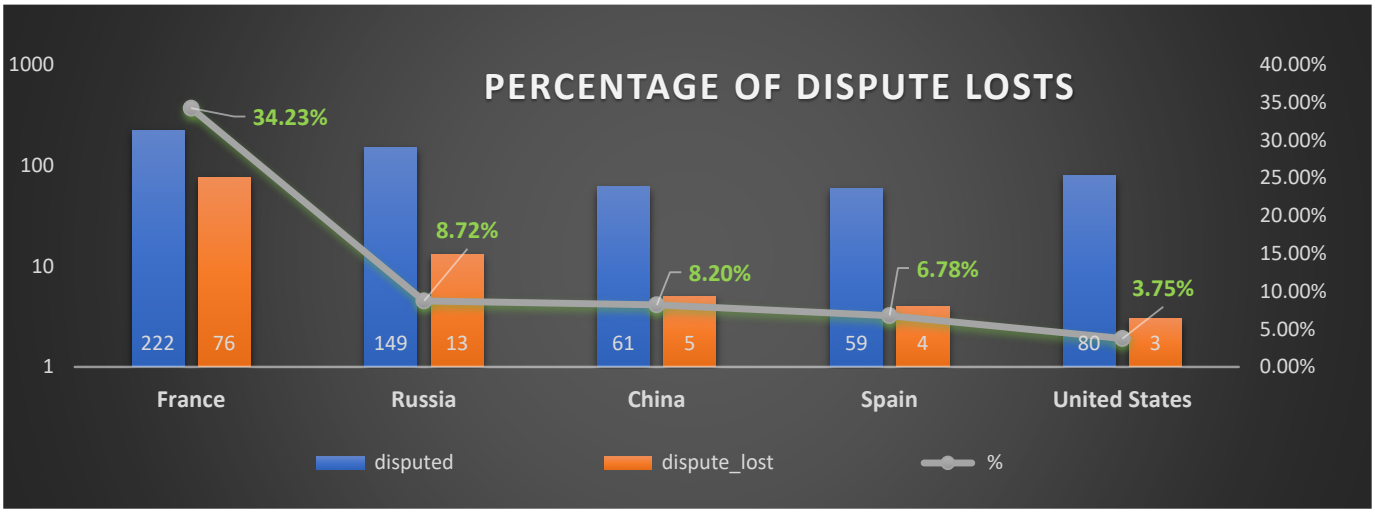
	country character varying	sum_of_disputed numeric	sum_of_dispute_lost numeric	percetage_of_lost numeric
1	Spain	59	4	0.07
2	China	61	5	0.08
3	United States	80	3	0.04
4	Russia	149	13	0.09
5	France	222	76	0.34

1 row returned

	percentage_of_dispute_lost numeric
1	17.69

country	disputed	dispute_lost	%
Spain	59	4	6.78%
China	61	5	8.20%
United States	80	3	3.75%
Russia	149	13	8.72%
France	222	76	34.23%
Grand Total	**571**	**101**	**17.69%**





Since there were 101 losses from 571 total disputes, the disputes' lost percentage is **17.69%.**

4) Percentage of revenue lost from disputes (within two decimal places).

```
--- 4) Percentages of revenue lost from disputes (within 2 decimal places)

SELECT  country,
        SUM(invoice_amount) AS Sum_of_ALL_Invoice
FROM yellevate_invoices
GROUP BY country
ORDER BY country;

SELECT  country,
        SUM(invoice_amount) AS Sum_of_Invoice_LOST
FROM yellevate_invoices
WHERE dispute_lost = 1
GROUP BY country
ORDER BY country;

SELECT
        ROUND(SUM(invoice_amount) /
        (SELECT sum(invoice_amount) FROM yellevate_invoices) * 100,2) AS lost_revenue
FROM yellevate_invoices
WHERE dispute_lost = 1;
```

5 rows returned

	country character varying	sum_of_all_invoice numeric
1	China	4004896
2	France	3942291
3	Russia	2450206
4	Spain	1634848
5	United States	2738077

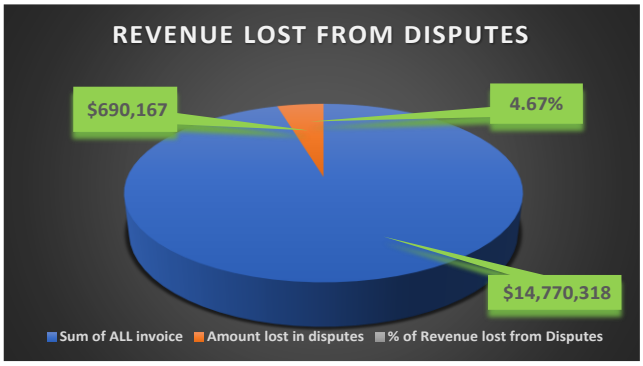
5 rows returned

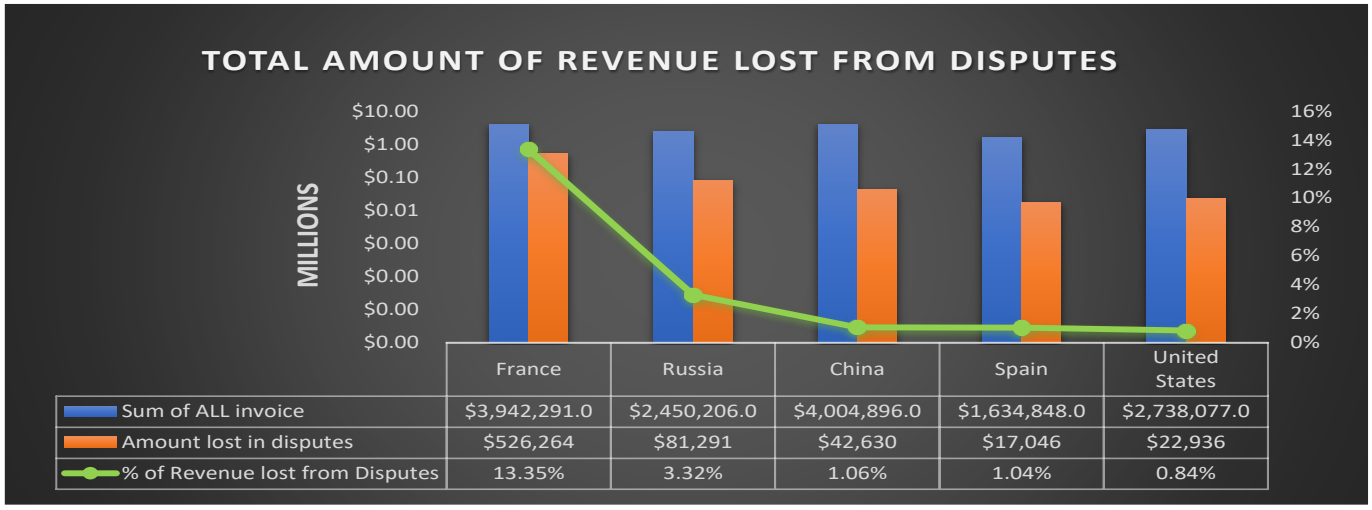
	country character varying	sum_of_invoice_lost numeric
1	China	42630
2	France	526264
3	Russia	81291
4	Spain	17046
5	United States	22936

1 row returned

	lost_revenue numeric
1	4.67

COUNTRY	Sum of ALL invoice	Amount lost in disputes	% of Revenue lost from Disputes
France	$ 3,942,291.00	$ 526,264	13.35%
Russia	$ 2,450,206.00	$ 81,291	3.32%
China	$ 4,004,896.00	$ 42,630	1.06%
Spain	$ 1,634,848.00	$ 17,046	1.04%
United States	$ 2,738,077.00	$ 22,936	0.84%
Grand Total	**$ 14,770,318.00**	**$ 690,167**	**4.67%**





Among the 5 countries, **FRANCE** has the highest percentage of disputes lost. With that, there is a significant impact on the loss of annual revenue of the company.

Total lost revenue from disputes **is about 4.67% amounting to USD 690,167.00.**

5) The country where the company reached the highest losses from lost disputes (in USD).

```
--- The country where the company reached the highest losses from lost disputes (in USD).
select country, sum(invoice_amount) AS loss_fr_disputes_USD
from yellevate_invoices
where dispute_lost = 1
group by country
order by loss_fr_disputes_USD desc;

select country, sum(invoice_amount) AS loss_fr_disputes_USD
from yellevate_invoices
where dispute_lost = 1
group by country
order by loss_fr_disputes_USD desc
limit 1;
```

5 rows returned

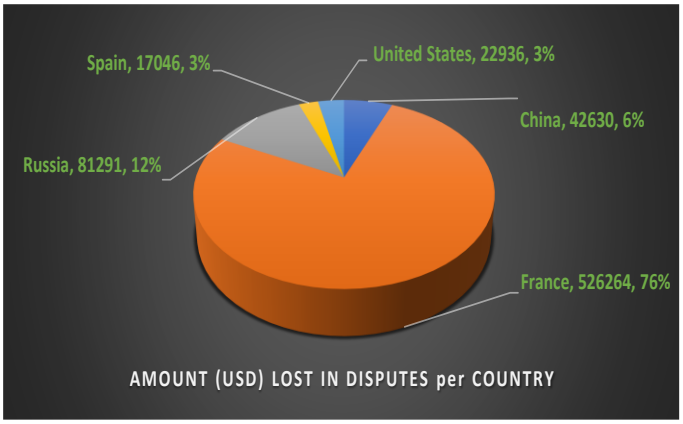
	country character varying	loss_fr_disputes_usd numeric
1	France	526264
2	Russia	81291
3	China	42630
4	United States	22936
5	Spain	17046

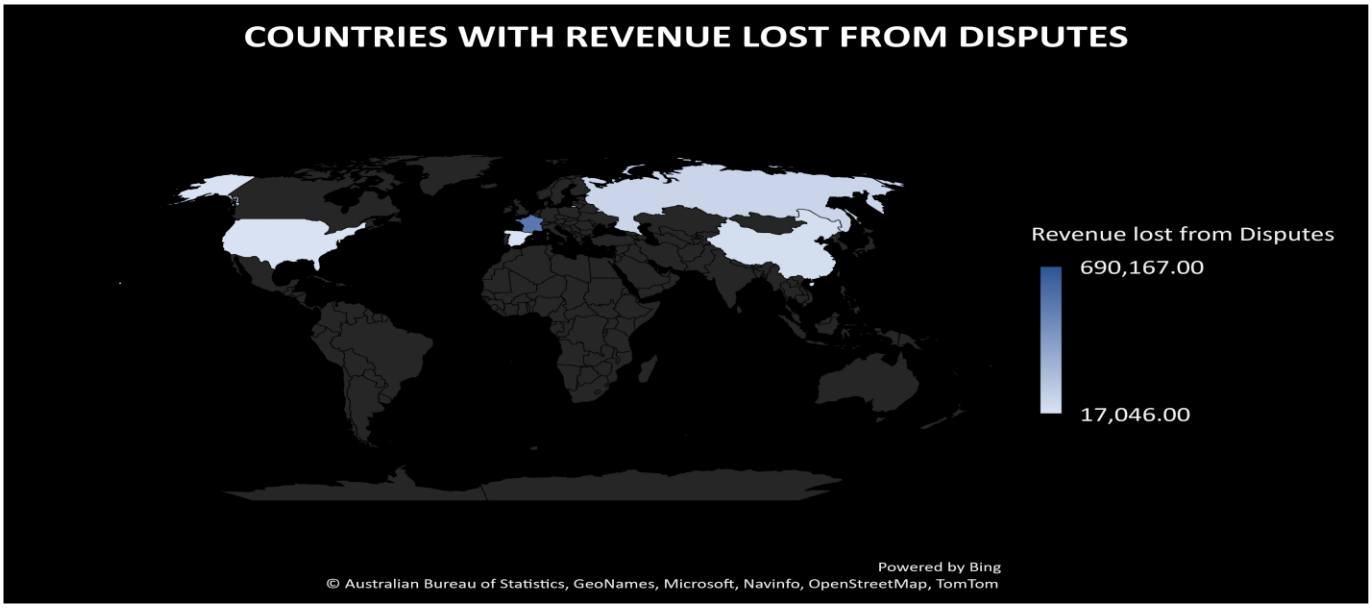
1 row returned

	country character varying	loss_fr_disputes_usd numeric
1	France	526264

dispute_lost	1

country	Sum of invoice_amount_usd
France	526,264.00
Russia	81,291.00
China	42,630.00
United States	22,936.00
Spain	17,046.00
Grand Total	**690,167.00**





The country where the company reached the highest losses from lost disputes **is FRANCE amounting USD 526,264.00.**

Recommendations:

To avoid disputes

CUSTOMER DISSATISFACTION – create a client feedback channel for resolving any complaints before it's time for an invoice.

INVOICE PROCESSING – always double-check all invoices details before sending them to your clients.

PRICING DISAGREEMENT – before getting started with a request, go over the pricing with your customer. This way, everyone would be on the same page.

PAYMENT CONSTRAINT – if the client is cash-strapped, they might dispute the invoice to extend the payment periods.

In handling Invoice Disputes

Go through the Agreements – when an invoice disputes issue comes up, the first place to look is the signed contract or any terms and conditions guiding the sales process. Penalties for late payment might be included.

Create a mutually beneficial solution – before you escalate the case, have a conversation with the client. You might just produce a solution that works for everyone.

Seek Legal Advice – An attorney would interpret legal provisions in the business contract plus additional evidence and let know the invoice dispute contractual procedures that apply.

Additional Insights with recommendation:

```sql
--- part of recommendations

SELECT DISTINCT country,
        (SELECT COUNT (invoice_number) FROM yellevate_invoices
                WHERE country = yi.country AND disputed = 1) AS invoices_wd,
        (SELECT ROUND (AVG(days_late),0) FROM yellevate_invoices
                WHERE country = yi.country AND disputed = 1) AS avg_dayslate_wd,
        (SELECT COUNT (invoice_number) FROM yellevate_invoices
                WHERE disputed = 1) AS invoice_wd_total,

        (SELECT COUNT (invoice_number) FROM yellevate_invoices
                WHERE country = yi.country AND disputed = 0) AS invoices_wd,
        (SELECT ROUND (AVG(days_late),0) FROM yellevate_invoices
                WHERE country = yi.country AND disputed = 0) AS avg_dayslate_wd,
        (SELECT COUNT (invoice_number) FROM yellevate_invoices
                WHERE disputed = 0) AS invoice_wd_total
FROM yellevate_invoices yi
ORDER BY 2 DESC;

SELECT  ROUND(AVG(days_late),0) AS Average_days_late
FROM yellevate_invoices
WHERE disputed = 1;

SELECT round(avg(days_late),0) AS Average_days_late
FROM yellevate_invoices
WHERE disputed = 0;
```

5 rows returned

	country character varying	invoices_wd bigint	avg_dayslate_wd numeric	invoice_wd_total bigint	invoices_wd bigint	avg_dayslate_wd numeric	invoice_wd_total bigint
1	France	222	7	571	339	2	1895
2	Russia	149	10	571	238	2	1895
3	United States	80	12	571	426	2	1895
4	China	61	6	571	555	1	1895
5	Spain	59	10	571	337	3	1895

1 row returned

	average_days_late numeric
1	8

1 row returned

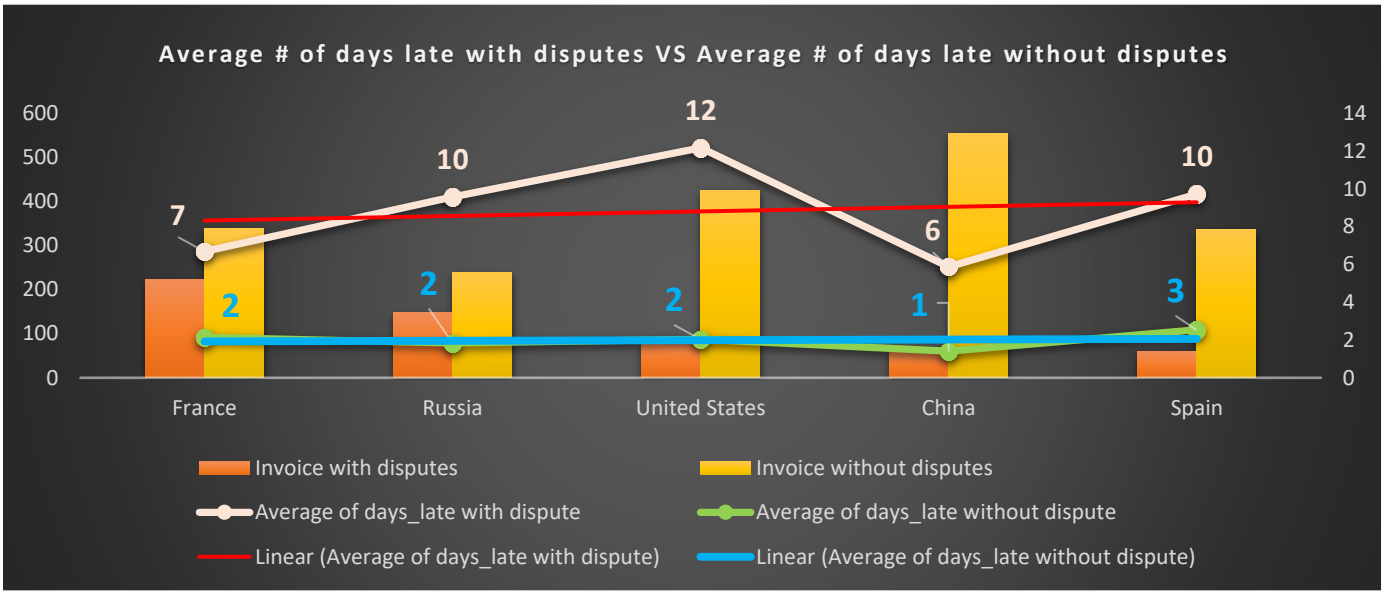
	average_days_late numeric
1	2

disputed	1

country	Average of days_late	Count of disputed
China	6	61
France	7	222
Russia	10	149
Spain	10	59
United States	12	80
Grand Total	**8**	**571**

disputed	0

country	Average of days_late	Count of disputed
China	1	555
France	2	339
Russia	2	238
Spain	3	337
United States	2	426
Grand Total	**2**	**1,895**



Invoices settled **more than 2 days late** are likely to give rise which can cause **17.69%** dispute loss. On the other hand, Invoices settled on time, in advance, or late but **no more than 2 days** rarely end up in disputes.

Our team recommends settling invoices on time or it is unavoidable to be late, an invoice should be settled not more than 2 days from the due date to lessen the disputes and it will be a favorable one towards Yellevate.

Additional Insights with recommendation:

```sql
--- part of recommendations #5
--- 3% is just a variable (an assumed reduced percentage)

SELECT ROUND(SUM(invoice_amount * dispute_lost) / SUM(invoice_amount)*100,2)
AS percetage_revenue_lost_from_disputes
FROM yellevate_invoices
WHERE country = 'France';

SELECT SUM(invoice_amount*.03)
FROM yellevate_invoices
WHERE country = 'France';

SELECT SUM(invoice_amount)
AS percetage_revenue_lost_from_disputes
FROM yellevate_invoices
WHERE country = 'France';
```

1 row returned

	percetage_revenue_lost_from_disputes numeric
1	13.35

1 row returned

	sum numeric
1	118268.73

1 row returned

	percetage_revenue_lost_from_disputes numeric
1	3942291

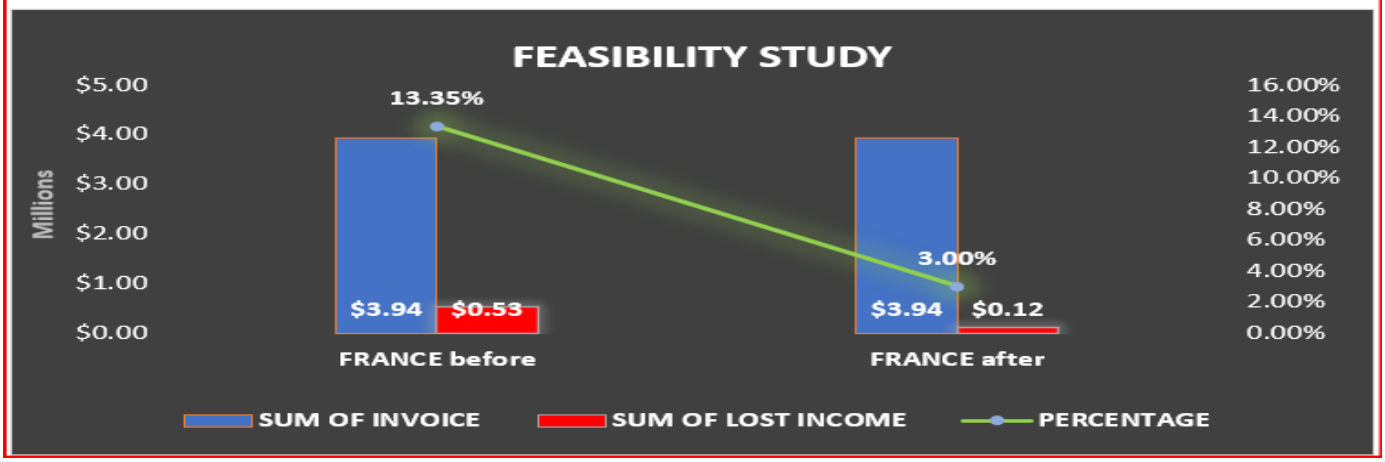
disputed (All)

country	Sum of invoice_amount_usd
China	4,004,896.00
France	3,942,291.00
Russia	2,450,206.00
Spain	1,634,848.00
United States	2,738,077.00
Grand Total	**14,770,318.00**

dispute_lost 1

country	Sum of invoice_amount_usd
China	42,630.00
France	526,264.00
Russia	81,291.00
Spain	17,046.00
United States	22,936.00
Grand Total	**690,167.00**

	PERCENTAGE	SUM OF INVOICE	SUM OF LOST INCOME
FRANCE before	13.35%	$3,942,291.00	$526,264.00
FRANCE after	3.00%	$3,942,291.00	$118,268.73
Total amount saved			$407,995.27



Since FRANCE has the most significant impact on annual revenue loss, amending its contract, and paying attention to the payment terms, schedule and duration are very imperative. We may also require clients to pay a commitment fee or a bond before the service is delivered. So, it will be easier to check if the study is effective.

If the company could avoid invoice disputes and reduce losses from unpaid invoices especially in France by up to 3%, the company could save an additional 10% of the annual's revenue of USD 407,995.00.

Conclusions:

The unprecedented increased number of disputes resulted in payment opt-out with customers to pay for the services. Team D.A. dived into given data from Yellevate to identify the cause of client's disputes that leads to 17.69% disputes lost and investigate the 4.67% (USD 690,167.00) revenue drop from clients' disputes lost. Those disputes came from 5 major countries in the world. Spain, USA, China, Russia especially France.

Team D.A. tracked down invoice settlements that require intensive attention. Recommends an average number of days invoices be settled to avoid disputes. And if in any case not settled on time, team D.A. set a certain grace period to finally settle the payments. Suggested to impose bond before the service is delivered. The creation of a technical working group is also imperative.

Implementing these parameters, checklists, and amendments will certainly avoid disputes and future loss of revenue for the company.

Definition of Terms (Data dictionary):

Field Name	Definition
Country	Country where the invoice was issued.
customerID	Unique identifier for each customer.
InvoiceNumber	Unique identifier for each invoice issued.
InvoiceDate	Date when the invoice was generated.
DueDate	Date when payment for the invoice is due.
Invoice Amount	The dollar value of the invoice; how much the customer needs to pay.
Disputed	"1" means the customer disputed the invoice; "0" means they did not.
DisputedLost	"1" means Yellevate lost the dispute, and the dispute was resolved in favor of the customer, and the customer does not have to pay the invoice; "0" means the customer did not win the dispute, and they are legally required to pay the full invoice amount, it either means that Yellevate won the dispute, or there was no dispute in the first place.
SettledDate	Date when either the customer paid the invoice, or if the dispute was resolved in favor of the customer, the decision that the customer does not have to pay was finalized.
DaysToSettle	A number of days from when the invoice was generated to when it was settled.
DaysLate	Several days from when the invoice was due to when it was settled, 0 when DueDate > SettledData, and thus the invoice was settled on time.

Sources:

https://www.google.com/search?q=defining+the+business+problem&rlz=1C1CHZN_enPH969PH969&oq=defining+the+business+problem&aqs=chrome..69i57j0i512j0i22i30l2j0i390l3.15533j1j15&sourceid=chrome&ie=UTF-8

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