ProApp

Introduction

ProApp is an innovative platform designed to address the operational challenges of empowering tradespeople in Indonesia while providing a trusted and transparent experience for customers seeking skilled services. By combining online and offline elements, ProApp connects customers with tradespeople such as plumbers, electricians, and handymen, offering convenience, security, and reliability.

The platform ensures transparency by integrating skills assessments, certifications, and background checks, which address the challenges of skill recognition and trust. This not only allows tradespeople to be paid fairly but also assures customers of high-quality service. With Indonesia's growing economy and increasing adoption of technology, ProApp aims to become the leading platform for bridging the gap between quality service and consumer trust, thereby transforming the service industry while optimizing operational efficiency.

Business story

ProApp brings together two main groups of stakeholders: Customers and Tradespeople (Members), to create an innovative marketplace that seamlessly connects skilled tradespeople with consumers in need of their services. Customers are individuals or businesses seeking help with tasks like plumbing, electrical work, gardening, and custom projects. Tradespeople, also called Members, are the skilled workers who perform these services. ProApp empowers these tradespeople by offering a platform where they can showcase their skills, get certified, and receive jobs from customers, all while being verified for security and professionalism.

The business process starts when a **Customer** sign up and enter his name and phone number and email. He pays the quote fee to request a **Task** on the platform, specifying details like the task description, budget, and location. The **Task** is then available for **Tradespeople,** members who submit **Bids** on the task, after signing up on the platform, entering credentials and paying the membership fee. **Tradespeople** are verified by the platform through a **Background Check** and each **Tradesperson** can also attain various certifications to improve their standing when the status is active. Customers review the **Bids** they receive and select one based on proximity, cost, and rating. The selected bid moves forward, and the task is assigned to the chosen tradesperson. Once the task is completed, **Customers** provide a rating and review, which helps other customers make informed choices in the future. The app tracks when one of the payment methods is received by the member. Note that the roles of customers and tradespeople can be interchangeable where a tradesperson can be existent in customer table.

Trades-people engagement in this platform forces them to pay the membership fee. The more they engage and place bids having certification and appropriate bid amount, good rating and being relatively close to the customer, the more they win the bids. The better the execution of

the task is, the better the rating and the chances of securing more tasks in the future and achieving higher profit. Higher proficiency levels allow Tradespeople to command higher rates, enabling them to earn more for each task completed.

With more tasks being executed, more commissions are earned by the platform aside from membership fee and quote fee. Securing good reviews gives good reputation to the platform attracting more customers and service providers.

We chose our entities as: Customer, Tradesperson, Task, Bid, Certification and Transaction with the following relationships:

customer requests tasks, task receive bid, member submits bid, customer selects bid, member gain certification, task has transaction, member receives transaction and customer makes transactions. No existing relationships between task and certification, customer and certification, bid and certification and bid and transaction.

The tables with there features are the followings

1. Customer Table

- C_ID: Unique identifier for each customer.
- C_Name: Name of the customer.
- C_Contact: Contact information (phone number).
- C_Email: NOT NULL - Email address of the customer.

2. Member (Tradesperson) Table

- M_ID: Unique identifier for each member.
- M_Name: NOT NULL - Name of the tradesperson.
- M_Contact: - Contact information for the tradesperson (e.g., phone number).
- M_Email: NOT NULL - Email address of the tradesperson.
- M_Background: Background information of the tradesperson (e.g., work experience, skill summary).
- MembershipType: ('Standard', 'Pro') DEFAULT 'Standard' - Indicates membership level of the tradesperson.

3. Task Table

- T_ID: Unique identifier for each task.
- T_Description:NOT NULL - Description of the task.
- T_Location: - Location where the task needs to be performed.
- T_Budget: - Budget allocated for the task.
- T_Status: ('Open', 'Assigned', 'Completed') DEFAULT 'Open' - Status of the task.
- ServiceType: -Type of service needed (e.g., Plumbing, Electrical).
- C_ID: Foreign Key to Customer (C_ID) - Indicates which customer posted the task.

- B_ID: Foreign Key to Bid (B_ID) - Indicates the bid selected for the task.
- RatingValue: Rating given to the tradesperson after the task is completed.
- ReviewReview provided by the customer for the completed task.
- Selection_Time: Time when the bid was selected for the task.

4. Bid Table

- B_ID: INT PRIMARY KEY AUTO_INCREMENT - Unique identifier for each bid.
- T_ID: INT - Foreign Key to Task (T_ID) - Indicates which task the bid is for.
- M_ID: INT - Foreign Key to Member (M_ID) - Indicates which member placed the bid.
- B_Amount: The amount quoted by the tradesperson for the task.
- B_Status: :('Pending', 'Accepted', 'Rejected') - Status of the bid.
- Distance_From_Customer: Distance of the tradesperson from the customer's location (in km).
- Bid_Time : the date and time when a bid is submitted.

5. Certification Table

- Cert_ID: Unique identifier for each certification.
- Cert_Type: Type of certification (e.g., Plumbing, Electrical).
- Cert_Date: Date when the certification was obtained.
- Cert_Expiration: Expiration date of the certification.
- Cert_Status: Status of the certification (e.g., Active, Expired).

6. Member_Certification Table (Associative Entity for Many-to-Many Relationship between Member and Certification)

- M_ID:Foreign Key to Member (M_ID).
- Cert_ID: Foreign Key to Certification (Cert_ID).
- PRIMARY KEY: Composite key (M_ID, Cert_ID) - Ensures each member-certification pair is unique.

7. Transaction Table

- Tran_ID: Unique identifier for each transaction.
- C_ID: Foreign Key to Customer (C_ID) - Indicates which customer made the transaction.
- B_ID: Foreign Key to Bid (B_ID) - Indicates the bid related to the transaction.
- M_ID: INT - Foreign Key to Member (M_ID) - Indicates which member received the transaction.
- Tran_Amount: Amount involved in the transaction.
- Tran_Type: ('Payment', 'Disbursement') - Type of transaction (e.g., payment by customer, disbursement to tradesperson).
- Tran_Date: Date and time of the transaction.
- Payment_Method: Payment method used (e.g., Credit Card, PayPal).
- Payment_Status ('Completed', 'Pending', 'Failed') - Status of the payment.

The tables presents the following rules:

Customer to Task:A **Customer** may request multiple **tasks** or none at all.Each **Task** must be requested by one **Customer**.

Customer to Transaction: A **Customer** may have multiple **transactions** or none at all. Each **Transaction** must be linked to one **Customer**.

Task to Bid: A **Task** may receive multiple bids or none at all. Each **Bid** must be associated with one **Task**.

Bid to Member: Each **Bid** must be submitted by one **Member**. A **Member** may submit multiple bids or none at all.

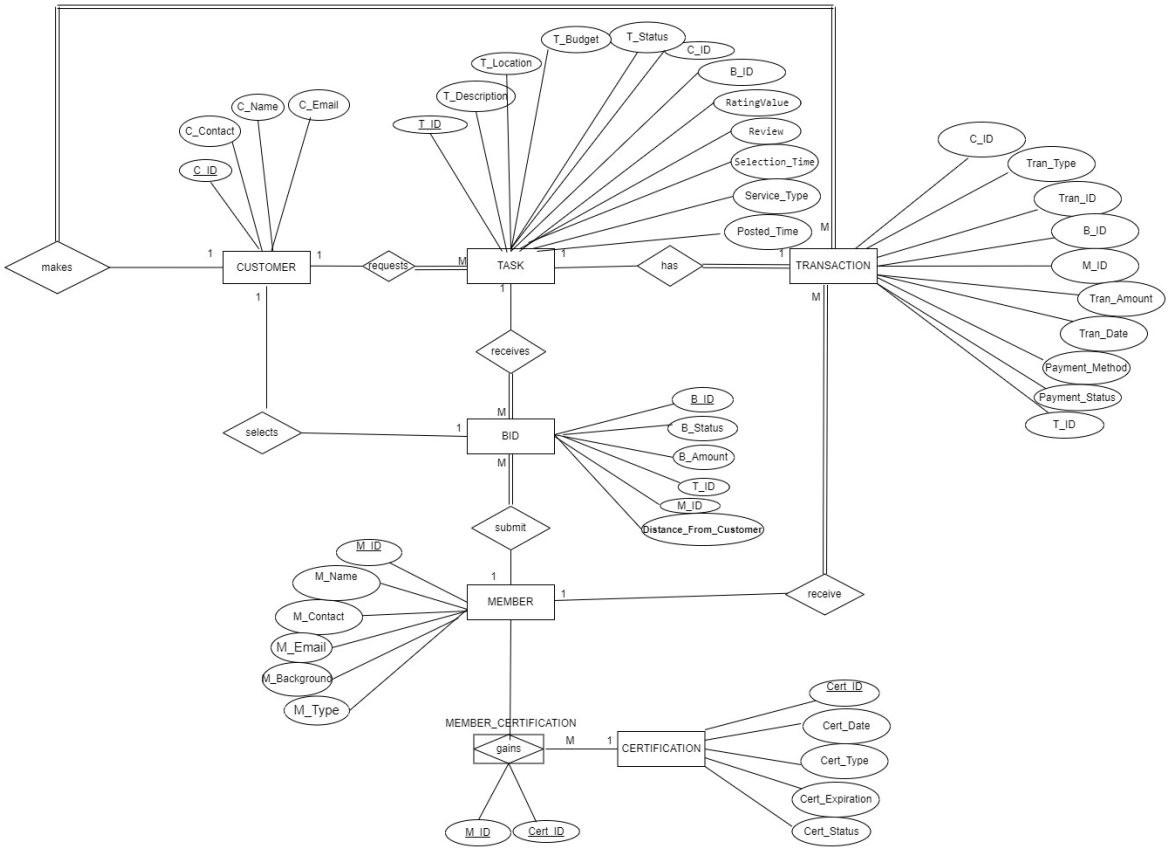
Customer to Bid (for selecting a bid): A **Customer** may select one bid for a task or none if no bid is selected yet. A **Bid** may or may not be selected by a **Customer**.

Task to Transaction: A **Task** may have multiple transactions or none at all. Each **Transaction** must be related to one **Task**.

Member to Transaction: A **Member** may receive multiple transactions or none at all. Each **Transaction** must be associated with one **Member**.

Member to Certification: A **Member** may gain multiple certifications or none at all. A **Certification** may be gained by multiple members or none.

This is the resulting entity relational database



Data is generated

C_ID	C_Name	C_Contact	C_Email
1	John Doe	+6281234567890	john.doe@example.com
2	Jane Smith	+6281234567891	jane.smith@example.com
3	Michael Johnson	+6281234567892	michael.johnson@example.com
4	Emily Davis	+6281234567893	emily.davis@example.com
5	David Brown	+6281234567894	david.brown@example.com
6	Linda White	+6281234567895	linda.white@example.com
7	James Wilson	+6281234567896	james.wilson@example.com
8	Patricia Taylor	+6281234567897	patricia.taylor@example.com
9	Robert Miller	+6281234567898	robert.miller@example.com
10	Mary Anderson	+6281234567899	mary.anderson@example.com

M_ID	M_Name	M_Contact	M_Email	M_Background	M_type
1	William Scott	+6281234567000	william.scott@example.com	Expert in plumbing and electrical services with o...	Standard
2	Elizabeth Martinez	+6281234567001	elizabeth.martinez@example.com	Skilled carpenter with a focus on custom furnitu...	Pro
3	Thomas Walker	+6281234567002	thomas.walker@example.com	Certified painter with specialization in residential...	Standard
4	Sarah Lee	+6281234567003	sarah.lee@example.com	Experienced electrician with background in indu...	Pro
5	Christopher Hall	+6281234567004	christopher.hall@example.com	Carpenter specializing in cabinetry and woodwo...	Standard
6	Barbara Allen	+6281234567005	barbara.allen@example.com	Professional plumber with experience in both re...	Pro
7	Daniel Young	+6281234567006	daniel.young@example.com	Experienced in home renovation projects, includ...	Standard
8	Jessica King	+6281234567007	jessica.king@example.com	Expert painter with a focus on interior design a...	Pro
9	Matthew Wright	+6281234567008	matthew.wright@example.com	Skilled in electrical maintenance and installation ...	Standard
10	Susan Harris	+6281234567009	susan.harris@example.com	Professional carpenter with a background in buil...	Pro

Cert_ID	Cert_Type	Cert_Date	Cert_Expiration	Cert_Status
1	Plumbing	2020-01-15	2024-01-15	Active
2	Electrical	2019-05-20	2025-05-20	Active
3	Carpentry	2019-08-30	2023-08-30	Expired
4	Painting	2020-09-10	2024-09-10	Active
5	Electrical	2021-02-18	2024-02-18	Active

M_ID	Cert_ID
2	1
6	1
1	2
4	2
10	2
3	3
9	3
5	4
8	4
7	5

B_ID	T_ID	M_ID	B_Amount	B_Status	B_Date	Distance_From_Customer
1	1	3	150.00	Pending	NULL	12.00
2	2	4	300.00	Accepted	2023-03-08 10:30:00	15.00
3	2	5	280.00	Rejected	2023-03-03 10:30:00	18.00
4	3	2	350.00	Accepted	2023-06-12 14:20:00	4.00
5	4	1	400.00	Pending	2023-07-24 13:45:00	3.00
6	5	6	500.00	Rejected	NULL	3.00
7	5	7	450.00	Accepted	NULL	4.00
8	6	8	200.00	Pending	NULL	17.00
9	7	9	300.00	Pending	NULL	1.00
10	8	10	280.00	Accepted	2023-09-05 11:00:00	5.00
11	9	5	320.00	Rejected	NULL	3.00
12	9	3	340.00	Accepted	NULL	1.00
13	10	4	180.00	Pending	NULL	17.00
14	10	2	250.00	Pending	NULL	2.00
15	3	1	400.00	Accepted	2023-06-10 14:20:00	10.00

Tran_ID	C_ID	B_ID	M_ID	T_ID	Tran_Amount	Tran_Type	Tran_Date	Payment_Method	Payment_Status
1	1	2	4	2	300.00	Payment	2023-03-12 10:45:00	Credit Card	Completed
2	3	5	1	3	750.00	Payment	2023-06-15 15:00:00	Bank Transfer	Completed
3	4	12	3	4	600.00	Payment	2023-08-01 14:00:00	PayPal	Completed
4	5	7	7	5	400.00	Payment	2023-07-10 09:30:00	Credit Card	Completed
5	8	10	10	8	300.00	Payment	2023-09-10 11:30:00	Credit Card	Completed

Business insights

1- How effectively are newly registered tradespeople getting engaged with the platform?

```
SELECT COUNT(DISTINCT Member.M_ID) AS TotalMembers,
       COUNT(DISTINCT CASE WHEN B_Status = 'Accepted' THEN Member.M_ID END)
       AS MembersWithAcceptedBids,
       (COUNT(DISTINCT CASE WHEN B_Status = 'Accepted' THEN Member.M_ID END) /
       COUNT(DISTINCT Member.M_ID) * 100)
       AS PercentageWithAcceptedBids
FROM Member
LEFT JOIN Bid ON Member.M_ID = Bid.M_ID;
```

TotalMembers	MembersWithAcceptedBids	PercentageWithAcceptedBids
10	6	60.0000

A moderate level of engagement is recorded by the tradespeople where only 60% of bids are accepted. That might be due to insufficient onboarding or lack of suitable tasks

In order to increase it, some onboarding strategies can be implemented such as guided tutorials on how to place competitive bids, or even mentoring from highly experienced tradespeople to enhance the bid quality.

2- Are customers selecting bids that are significantly lower or higher than their original task budgets?

```
SELECT Task.T_ID, T_Description, T_Budget, AVG(B_Amount) AS AverageBidAmount,
 MIN(B_Amount) AS MinBid, MAX(B_Amount) AS MaxBid
FROM Task
JOIN Bid ON Task.T_ID = Bid.T_ID
GROUP BY Task.T_ID, T_Description, T_Budget
HAVING AVG(B_Amount) < T_Budget * 0.8 OR AVG(B_Amount) > T_Budget * 1.2;
```

T_ID	T_Description	T_Budget	AverageBidAmount	MinBid	MaxBid
1	Install new electrical wiring in the kitchen	500.00	150.000000	150.00	150.00
3	Paint the exterior of the house	750.00	375.000000	350.00	400.00
4	Build custom wooden cabinets	600.00	400.000000	400.00	400.00
6	Install new lighting fixtures	450.00	200.000000	200.00	200.00
9	Install a new sink in the kitchen	550.00	330.000000	320.00	340.00

We tested if the selected bids are less than 80% or more than 120% of the customer budget to check if the tradesperson's pricing are within the customer expectations. That was relatively the case here.

To insure that, we can implement a bid suggestion feature to help customers estimate realistic budgets based on similar tasks completed in the past. Additionally, educate tradespeople on pricing strategies through a training module.

3- How does the response time between when a task is posted and when the first bid is received affect customer satisfaction ratings and reviews?

```
SELECT Task.T_ID, Task.T_Description, Task.Posted_Time, MIN(Bid.B_Date) AS FirstBidTime,
       TIMESTAMPDIFF(HOUR, Task.Posted_Time, MIN(Bid.B_Date)) AS ResponseTimeHours,
       Task.RatingValue, Task.Review
FROM Task
JOIN Bid ON Task.T_ID = Bid.T_ID
WHERE Task.RatingValue IS NOT NULL
GROUP BY Task.T_ID, Task.T_Description, Task.Posted_Time, Task.RatingValue, Task.Review
ORDER BY ResponseTimeHours ASC;
```

T_ID	T_Description	Posted_Time	FirstBidTime	ResponseTimeHours	RatingValue	Review
3	Paint the exterior of the house	2023-06-08 14:20:00	2023-06-10 14:20:00	48	4	Very satisfied with the quality of work.
2	Fix plumbing issues in the bathroom	2023-02-27 10:30:00	2023-03-03 10:30:00	96	5	Great job done with professionalism!
8	Repaint living room walls	2023-08-31 11:00:00	2023-09-05 11:00:00	120	4	Clean and tidy work.
4	Build custom wooden cabinets	2023-07-16 13:45:00	2023-07-24 13:45:00	192	3	Good work, but could be faster.

Generally, tasks with shorter response times (48 and 96 hours) have higher ratings (4 and 5). In contrast, the longer response time of 192 hours resulted in a relatively lower rating (3).

There seems to be a negative correlation between response time and customer satisfaction. Customers are happier when their tasks receive bids quickly.

Encourage tradespeople to prioritize time-sensitive tasks, especially those where the customer might have indicated urgency. You could also introduce a feature where customers can mark tasks as urgent, and such tasks receive priority, possibly accompanied by incentives for tradespeople to bid on them quickly.

4- Which service categories have the highest cancellation rates, and what actions can be taken to reduce cancellations?

```sql
SELECT ServiceType, COUNT(T_ID) AS TotalTasks,
       SUM(CASE WHEN T_Status = 'Open' THEN 1 ELSE 0 END) AS CancelledTasks,
       (SUM(CASE WHEN T_Status = 'Open' THEN 1 ELSE 0 END) / COUNT(T_ID) * 100) AS CancellationRate
FROM Task
GROUP BY ServiceType
ORDER BY CancellationRate DESC;
```

ServiceType	TotalTasks	CancelledTasks	CancellationRate
Electrical	3	3	100.0000
Carpentry	2	1	50.0000
Plumbing	3	0	0.0000
Painting	2	0	0.0000

Electrical services have a 100% cancellation rate, which is concerning since all tasks posted in this category were eventually canceled. Carpentry services have a 50% cancellation rate, indicating some issues, while Plumbing and Painting have 0% cancellation rates, which is a positive indicator of stability and reliability in these services.

Actions are needed to address the issue, this may involve reaching out to customers and tradespeople to understand if the issue lies in the service expectations, task pricing, or availability of tradespeople. Ensuring that they are adequately trained and certified is a key recommendation.

On the other hand, leveraging the success of plumbing and painting by promoting these services to potential customers is highly recommended. Highlighting these services as reliable options may attract more tasks in these categories.

5- How does certification impact the success rate of bids by members?

```sql
SELECT Member.M_ID, Member.M_Name, COUNT(Bid.B_ID) AS TotalBids,
       SUM(CASE WHEN Bid.B_Status = 'Accepted' THEN 1 ELSE 0 END) AS AcceptedBids,
       (SUM(CASE WHEN Bid.B_Status = 'Accepted' THEN 1 ELSE 0 END) / COUNT(Bid.B_ID)) * 100 AS SuccessRate
       COUNT(DISTINCT Member_Certification.Cert_ID) AS CertificationsCount
FROM Member
LEFT JOIN Bid ON Member.M_ID = Bid.M_ID
LEFT JOIN Member_Certification ON Member.M_ID = Member_Certification.M_ID
GROUP BY Member.M_ID, Member.M_Name
ORDER BY SuccessRate DESC;
```

M_ID	M_Name	TotalBids	AcceptedBids	SuccessRate	CertificationsCount
3	Thomas Walker	2	1	50.0000	1
4	Sarah Lee	2	1	50.0000	1
5	Christopher Hall	2	0	0.0000	1
6	Barbara Allen	1	0	0.0000	1
8	Jessica King	1	0	0.0000	1
9	Matthew Wright	1	0	0.0000	1

The current data shows that having a certification alone may not guarantee success, so it may be useful to differentiate the quality or type of certifications. Bid success might be depending on

other factors than certification, like presenting the skills effectively and knowing how to align the services with the customer expectations.

It's important to assess whether certain certifications correlate with higher success rates.

Consider promoting members like **Thomas Walker** and **Sarah Lee**, who have demonstrated higher success rates. Highlighting them on the platform could increase customer trust and engagement, leading to more successful bids.

6- Does the proximity of tradespeople to task locations influence the completion rates?

M_ID	M_Name	T_Location	AvgDistanceFromCustomer	CompletedTransactions
1	William Scott	Medan	3.000000	1
6	Barbara Allen	Bali	3.000000	1
2	Elizabeth Martinez	Surabaya	4.000000	1
7	Daniel Young	Bali	4.000000	1
10	Susan Harris	Bogor	5.000000	1
1	William Scott	Surabaya	10.000000	1
4	Sarah Lee	Jakarta	15.000000	1
5	Christopher Hall	Jakarta	18.000000	1

The data suggests that proximity may have positively influenced task fulfillment. It is evident that tasks completed by tradespeople with a shorter average distance (e.g., 3-5 km) seem to be more successful, possibly due to lower travel time and convenience. Therefore, consider prioritizing local tradespeople when matching them with new tasks.

Even with greater distances, the tasks were completed, indicating that a longer distance does not necessarily prevent successful task completion, but it could affect the efficiency. If tasks that are farther away have issues, consider offering incentives like travel compensation to motivate tradespeople and improve completion rates.

By focusing on improving the matching process for shorter distances, and providing additional support for tradespeople willing to travel longer distances, the platform can enhance operational efficiency and user satisfaction, ultimately benefiting both customers and tradespeople.

In conclusion, the analysis reveals key opportunities to enhance platform performance. Improving tradespeople onboarding and response times, aligning bid pricing with customer expectations, and prioritizing proximity in task matching are crucial for increasing customer satisfaction. Addressing service-specific issues and promoting tradespeople with demonstrated success can further boost reliability and trust. By implementing these targeted strategies, the platform can enhance engagement, efficiency, and overall user satisfaction.