

DECISION SUPPORT SYSTEM FEASIBILITY OF GRANTING RECEIVABLES ON GOODS EXPORT SERVICES IN FREIGHT FORWARDING COMPANY WITH PROFILE MATCHING METHOD

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Abstract— Decision Support System (DSS) is a system that is able to provide problem solving skills in both semi-structured and unstructured ways. The company's role in the import-export business is very important because it can meet the needs of people who have been doing business in the trade sector, both domestic trade and international trade. Indonesia as a country with a high volume of international trade requires a transportation service company that can support goods export activities by providing payment facilities with a certain time period. The problem that occurs is that there are customers who experience congestion in payment of receivables. This is because there is no standardized procedure in determining the granting of receivables so that it is difficult to determine the feasibility of granting receivables to customers. Therefore, researchers will conduct research on a decision support system with the profile matching method to determine the feasibility of granting receivables to goods export services by applying the 5C principle so that decision makers do not use intuition again and have methods or standardized procedures in providing receivables to customers. This research is expected to help determine the feasibility of receivables by applying the 5C principle, it is hoped that it can help decision makers in making decisions about giving credit to customers.

Keywords: Export, 5C principles, Profile Matching, Decision Support System

Abstrak—Sistem Pendukung Keputusan (SPK) adalah sebuah sistem yang mampu memberikan kemampuan pemecahan masalah baik secara semi terstruktur maupun tidak terstruktur. Peran perusahaan dalam bisnis ekspor impor sangat penting karena dapat memenuhi kebutuhan masyarakat yang telah melakukan bisnis dalam bidang perdagangan, baik perdagangan domestik maupun perdagangan internasional. Indonesia sebagai negara dengan volume perdagangan internasional yang tinggi membutuhkan perusahaan jasa angkutan yang dapat menunjang kegiatan ekspor barang dengan memberikan fasilitas pembayaran dengan tempo waktu tertentu. Permasalahan yang terjadi adalah adanya customer yang mengalami kemacetan dalam pembayaran piutang. Hal ini dikarenakan belum adanya standarisasi prosedur dalam penentuan pemberian piutang sehingga sulit menentukan kelayakan dalam pemberian piutang terhadap customer. Oleh karena itu, peneliti akan membuat penelitian mengenai sistem pendukung keputusan dengan metode profile matching untuk menentukan kelayakan pemberian piutang pada jasa ekspor barang dengan menerapkan prinsip 5C sehingga decision maker tidak menggunakan intuisi kembali dan memiliki metode atau standarisasi prosedur dalam memberikan piutang terhadap customer. Hasil pada penelitian ini diharapkan dapat membantu untuk menentukan kelayakan piutang dengan menerapkan prinsip 5C, diharapkan dapat membantu decision maker dalam pengambilan keputusan pemberian piutang terhadap customer.

Kata kunci: Ekspor, prinsip 5C, Profile Matching, Sistem Pendukung Keputusan

INTRODUCTION

The role of freight forwarding services greatly facilitates exports and imports in the process of sending goods across national borders. In Indonesia, freight forwarder companies have

started to exist in 1970 although they are still only in the form of groups [1]. Currently, Indonesia has entered the era of the global market, where all barriers to trade activities are small but competition is high in the world of trade [2]. Accounts receivable activity very often done in the world of freight



forwarding. Accounts receivable is an income that will be received from a company in the form of cash, either as a result of the delivery of goods and services on credit or as a result of overpayment of cash to other parties [3]. The provision of Accounts receivable is carried out to speed up the process of exporting goods for customers who routinely use freight forwarding services [4]. Based on initial observations made on the object of research, the problem that occurs is that there are customers who experience congestion in making payments for receivables. This happens because decisions in granting receivables is only made using the intuition of the decision maker. The profile matching method is the method used in this study which is carried out based on the 5C principle (Character, Capacity, Collateral, Capital, Condition) [5]

Decision Support System

A decision support system can be defined as a system designed and used to support management in decision making [6][7][8]. Decision support systems can be used by someone in making decisions to be more effective [9].

Accounts receivable

Accounts receivable are company claims to other parties (companies) due to previous events in the form of money, goods, services or in the form of other non-cash assets that must be billed on the due date [10]. Receivables include all money claimed against other entities, both individuals, companies and other organizations [11].

Profile Matching Method

The Profile Matching method is a decision making by assuming an ideal predicate variable that must be met [12]. The profile matching method or better known as the GAP method (weighting value) is a method that often used in decision making by assuming that there is an ideal level of predictor variable and must be met. [9].

MATERIALS AND METHODS

The system development method approach used by researchers is the profile matching method [13]. The Profile Matching procedure is as follows:

1. Competency GAP Mapping

The competency gap is the difference between the existing criteria and the desired criteria [14]. The competency GAP formula is: GAP = Criteria Value – Minimum Value

2. Determination of weighting

If the GAP mapping has completed, then the results from the mapping are given a weighted value

according to the benchmark table 1 the weight of the GAP value.

Table 1. GAP Value Weight

No	GAP difference	Value Weight	Description
1	0	5	Competence as required
2	1	4,5	Competency of the subject excess 1 level
3	-1	4	Competency of the subject lacks 1 level
4	2	3,5	Competency of the subject excess 2 level
5	-2	3	Competency of the subject lacks 2 levels
6	3	2,5	Competency of the subject excess 3 level
7	-3	2	Competency of the subject lacks 3 levels
8	4	1,5	Competency of the subject excess 4 level
9	-4	1	Competency of the subject lacks 4 levels

3. Calculation and Grouping (core factor and secondary factor)

After we determine the weight of the gap value, then each aspect is grouped into 2 groups, namely the core factor and secondary factor.

- Core factor is an aspect that most needed. The formula used to calculate the core factor is:

$$NCF = \frac{\sum NC(5c)}{\sum IC} \dots\dots\dots (1)$$

Where:

- NCF = The average value of core factor
- NC(5C) = Total value of core factor (Character, Capacity, Collateral, Capital, Condition)
- IC = Number of core factor items

- Secondary factors are items other than aspects that exist in the core factor. To calculate the secondary factor the formula used is:

$$NSF = \frac{\sum NS(5c)}{\sum IS} \dots\dots\dots (2)$$

Where:

- NSF = Average value of secondary factor
- NS(5C) = Total value of secondary factor (Character, Capacity, Collateral, Capital, Condition)
- IS = Number of secondary factor items

4. Total Calculation

From all the results of the calculation of each principle, the next step is to calculate the total value based on the percentage of core factors and



secondary factors that will affect the customer profile. [15]. The following is the formula to calculate the total value of each aspect:

$$(x)\% NCF + (x)\% NSF = N(5c) \dots\dots\dots (3)$$

Where:

- (X)% = Inputted percentage value
- NCF = Core factor average
- NSF = Average value of secondary factor
- N = The total value of the 5c principle
- N(5c) = (Character, Capacity, Collateral, Capital, Condition)

5. Calculation of Ranking

The result of the profile matching process is the ranking of customers who are eligible for credit. The determination of the ranking refers to the calculation results that have been obtained by the following formula:

$$\begin{aligned} \text{Final score} = & (x)\%N\text{Character} \\ & + (x)\%N\text{Capacity} \\ & + (x)\%N\text{Collateral} \\ & + (x)\%N\text{Capital} \\ & + (x)\%N\text{Condition} \end{aligned}$$

A. Prinsip 5C

The 5C principle is a principle that is used as a reference in granting credit to someone [16].

B. Data Collection

The data collection method used by the researcher is:

1. Interview
The interview is to ask questions directly to the decision-maker so that data and information collection will be more relevant and accurate.
2. Observation
Observation techniques are carried out by making observations to obtain the required data.
3. Literature Study
Data collection is generated by researching, studying, reading several books, and reading journals related to decision support systems. In this case, the research conducted is related to the import of goods in freight forwarding companies, the feasibility of granting receivables, the profile matching method, etc.
4. Documentation
Documentation is collecting documents related to data requirements that can support procedures. In this case, all documents that are owned are obtained through documents or archives originating from the company under study. In this study, data collection was carried out by studying facts or data such as the process of exporting goods at PT Carbin Teknologi

Logistik, customer data and receivable payment methods as well as receivables data.

Character, Capacity, Capital, Collateral, Condition of Economy is known as the 5C principle. The following is a hierarchy of decision-making for granting receivables.

1. Character

Character consists of 2 parts, namely HSCode and destroy. HSCode is an international code in the grouping of types of goods. Meanwhile, destroy is if the export goods have entered the country and the tax is high, then the exporter does not want to pay the tax. Table 2 describes some of the criteria that will be used in the HSCode criteria.

Table 2. HSCode Criteria

HSCode Criteria	Description	Weight Value
GreenLine	Without checking	3
Green Yellow	Documents required	2
Green Red	Required physical inspection of goods	1

Table 3 explains some of the criteria that will be used in the criteria for destroying goods.

Table 3. Item Destroy Criteria

Item Destroy Criteria	Description	Weight Value
Frequently	>10	1
Moderate	5-10	2
Infrequently	0-5	3

2. Capacity

Capacity consists of 2 parts, namely the number of transactions per month (kilograms) and the average invoice per month. The number of kilograms per month is the number of kilograms of shippers per month and the average invoice per month is the average invoice shipper per month. Table 4 describes several criteria that will be used in the criteria for the number of transactions.

Table 4. Criteria Number of transactions

Criterion	Description	Weight Value
High	>1000 kg	5
High Enough	801-1000 kg	4
Moderate	501-800 kg	3
Moderate enough	301-500 kg	2
Not enough	100-300 kg	1

Table 5 explains some of the criteria that will be used in the criteria for the Average invoice per month.



Table 5. Criteria for Average Invoice Per Month

Criterion	Description	Weight Value
Very good	>30 million	4
Good	21-30 million	3
Moderate	11-20 million	2
Deficient	1-10 million	1

3. Capital

Capital consists of 2 parts, namely SIUP and number of employees. SIUP is a permit issued by the minister or appointed official to entrepreneurs to carry out business in the trade and services sector. While the number of employees is the number of employees in the shipper company.

Table 6 describes several criteria that will use in the SIUP criteria.

Table 6. SIUP Criterion

SIUP Criterion	Weight Value
High	3
Medium	2
Small	1

Table 7 describes some of the criteria used as criteria for the number of employees.

Table 7. Criteria Number of Employees

Criteria	Number of employees	Weight Value
Small	1-20	1
Medium	21-100	2
High	>100	3

4. Collateral

The collateral consists of 2 parts, namely the percentage of deposits and freight. The percentage of deposits is the percentage of deposits that must be deposited from the average invoice value per month and freight is the value of goods. Table 8 explains some of the criteria used in the criteria for the percentage of deposits.

Table 8. Deposit Percentage Criteria

Criteria	Description of Deposit Percentage	Weight Value
High	31-50%	3
Medium	11-30%	2
Low	1-10%	1

Table 9 describes some of the criteria used in freight.

Table 9. Freight Criteria

Criterion	Freight Description	Weight Value
High	>1500	3
Medium	101-1500	2
Small	1-100	1

5. Condition of Economy

The condition of the economy consists of 2 parts, namely the feasibility of the business field and the type of goods. The line of business that is feasible or not is the feasibility of the business field of the company that will be given the receivables. and the type of goods is the company that will be given receivables engaged in the business what type of goods. Table 10 describes some of the criteria used in the eligibility criteria for the business sector.

Table 10. business feasibility

Criteria	Weight Value
Industry	3
Distributor	2
Service	1

Table 11 explains some of the criteria used in the criteria for types of goods.

Table 11. Criteria of Types of goods

Item criteria	Weight Value
Consumption	1
Industry	2
Standard	3

Each principle has a different weight according to the 5C principle. Table 12 describes the weighted values of each of the 5C principle criteria.

Table 12. 5C principle weighting

Principle	Weight Value
Character	25%
Capacity	25%
Capital	15%
Collateral	20%
Condition of Economy	15%

RESULTS AND DISCUSSION

In this research, a decision support system will be made using the profile matching method to determine the feasibility of granting receivables. All data used in this study were obtained from interviews, observations, literature studies, and documentation in freight forwarding companies. Table 13 contains the criteria that have been determined as the core factor and secondary factor of each principle and the company's target value.

Table 13. Core Factor and Secondary Factor and Company Target Value

No	Valuation Principle	Code	Group	Company Target Value
1	Prinsip Character	CR	-	-
a.	HSCode	K1	CF	3

	b. Destroy goods	K2	SF	3
2	Capacity Principle	CY	-	-
	a. Number of transactions per month (kg)	K3	CF	5
	b. Average invoice per month	K4	SF	4
3	Capital Principle	CL	-	-
	a. SIUP	K5	CF	3
	b. Number of employees	K6	SF	3
4	Collateral Principle	CT	-	-
	a. Deposit percentage	K7	CF	3
	b. Freight	K8	SF	3
5	Condition of Economy Principle	CE	-	-
	a. Eligibility of business field	K9	CF	3
	b. Types of goods	K10	SF	3

After determining the criteria and weights of each criterion to be used, the next step is to explain the calculations and the expected outputs in this study. The following is an explanation of the calculation and expected output:

1. Criteria:
 - a. HSCode (K1)
 - b. Destroy goods (K2)
 - c. Number of transactions per month (kg) (K3)
 - d. Average invoice per month (K4)
 - e. SIUP (K5)
 - f. Number of employees (K6)
 - g. Deposit percentage (K7)
 - h. Freight (K8)
 - i. Business Feasibility (K9)
 - j. Types of goods (K10)

2. Determine the value of each Shipper.

Table 14 is the value of the character criteria obtained.

No	Shipper's Name	HSCode (K1)	Destroy goods (K2)
1	PT IVS Express	1	1
2	PT Texas Integrasi	2	2

Table 15 is the value of the capacity criteria obtained.

No	Shipper's Name	Number of transactions per month (K3)	Average Invoice (K4)
1	PT IVS Express	1	1
2	PT Texas Integrasi	4	3

Table 16 contains the value of the capital criteria obtained.

No	Shipper's Name	SIUP (K5)	Number of employees (K6)
1	PT IVS Express	1	1
2	PT Texas Integrasi	2	2

In table 17 is the value of the collateral criteria obtained.

No	Shipper's Name	Deposit Percentage (K7)	Freight (K8)
1	PT IVS Express	1	1
2	PT Texas Integrasi	3	2

Table 18 is the value of the condition of economy criteria obtained.

No	Shipper's Name	Business Feasibility (K9)	Types of goods (K10)
1	PT IVS Express	1	1
2	PT Texas Integrasi	3	2

3. Determine the value of the gap from each criterion.

Table 19 is the determination of the calculation of the value of the gap character criteria.

No	Shipper's Name	HSCode (K1)	Destroy goods (K2)
1	PT IVS Express	1	1
2	PT Texas Integrasi	2	2
Gap Profile			
1	PT IVS Express	-2	-2
2	PT Texas Integrasi	-1	-1

Table 20 is the determination of the calculation of the value of the gap capacity criteria.

No	Shipper's Name	Number of Transactions Per Month (K3)	Average Invoice (K4)
1	PT IVS Express	1	1

No	Shipper's Name	Number of Transactions Per Month (K3)	Average Invoice (K4)
2	PT Taxas Integrasi	4	3
Gap Profile		5	4
1	PT IVS Express	-4	-3
2	PT Taxas Integrasi	-1	-1

Table 21 is the determination of the calculation of the gap for capital criteria.

Table 21. Calculation of Capital Gap

No	Shipper's Name	SIUP (K5)	Number of employees (K6)
1	PT IVS Express	1	1
2	PT Taxas Integrasi	2	2
Gap Profile		3	3
1	PT IVS Express	-2	-2
2	PT Taxas Integrasi	-1	-1

Table 22 is the determination of the calculation of the gap for criteria of collateral.

Table 22. Calculation of Collateral Gap

No	Shipper's Name	Deposit Percentage (K7)	Freight (K8)
1	PT IVS Express	1	1
2	PT Taxas Integrasi	3	2
Gap Profile		3	3
1	PT IVS Express	-2	-2
2	PT Taxas Integrasi	0	-1

Table 23 is the determination of the calculation of the gap for the criteria of economic condition.

Table 23. Calculation of the Economic Condition Gap

No	Shipper's Name	Business Feasibility (K9)	Types of goods (K10)
1	PT IVS Express	1	1
2	PT Taxas Integrasi	3	2
Gap Profile		3	3
1	PT IVS Express	-2	-2
2	PT Taxas Integrasi	0	-1

4. Weighting the difference by the GAP value weight table.

Table 24 is the result of weighing the value of the gap character.

Table 24. Character Gap Weighting Results

No	Shipper's Name	HSCode (K1)	Destroy goods (K2)
1	PT IVS Express	3	3
2	PT Taxas Integrasi	4	4

In table 25 is the result of weighing the value of the gap capacity.

Table 25. Gap Capacity Weighing Results

No	Shipper's Name	Number of Transactions Per Month (K3)	Average Invoice (K4)
1	PT IVS Express	1	2
2	PT Taxas Integrasi	4	4

Table 26 contains examples of the results of weighing the value of the capital gap.

Table 26. Gap Capital Weighting Results

No	Shipper's Name	SIUP (K5)	Number of employees (K6)
1	PT IVS Express	3	3
2	PT Taxas Integrasi	4	4

Table 27 is the result of weighing the value of the collateral gap.

Table 27. Gap Collateral Weighting Results

No	Shipper's Name	Deposit Percentage (K7)	Freight (K8)
1	PT IVS Express	3	3
2	PT Taxas Integrasi	5	4

Table 28 is the result of weighing the value of the gap condition of the economy.

Table 28. Gap Condition of Economy Weighting Results

No	Shipper's Name	Business Feasibility (K9)	types of goods (K10)
1	PT IVS Express	3	3
2	PT Taxas Integrasi	5	4

5. Calculate the value of the core factor and secondary factor to get the weight on each criteria.

Table 29 contains an example of the results of grouping the weight of the gap value on the character criteria.

Table 29. Grouping Value Weighted Gap of Character

No	Shipper's Name	(K1)	(K2)	CF	SF	T1
1	PT IVS Express	3	3	3	3	3
2	PT Taxas Integrasi	4	4	4	4	4

Manual calculation of Character Calculation of CF and SF:

PT IVS Express (CF) = 1.8

PT Taxas Integrasi (CF) = 2.4

PT IVS Express (SF) = 1.2
PT Taxas Integrasi (SF) = 1.6

Manual calculation of the sum of the core factor and secondary factor for each character
PT IVS Express (T1) = 3
PT Taxas Integrasi (T1) = 4

Table 30 contains the weight grouping of the capacity criteria gap values.

Table 30. Grouping Gap Capacity Values

No	Shipper's Name	(K3)	(K4)	CF	SF	T1
1	PT IVS Express	1	2	1	2	1.4
2	PT Taxas Integrasi	4	4	4	4	4

Manual calculation of *Capacity* of CF dan SF:

PT IVS Express (CF) = 0.6
PT Taxas Integrasi (CF) = 2.4
PT IVS Express (SF) = 0.8
PT Taxas Integrasi (SF) = 1.6

Manual calculation of the sum of the core factor and secondary factor for each character.

PT IVS Express (T2) = 1.4
PT Taxas Integrasi (T2) = 4

Table 31 contains the weight grouping of the capital criteria gap values.

Table 31. Grouping of the Capital Criteria Gap Values

No	Shipper's Name	(K5)	(K6)	CF	SF	T1
1	PT IVS Express	3	3	3	3	3
2	PT Taxas Integrasi	4	4	4	4	4

Manual calculation of *Capital* of CF dan SF:

PT IVS Express (CF) = 1.8
PT Taxas Integrasi (CF) = 2.4
PT IVS Express (SF) = 1.2
PT Taxas Integrasi (SF) = 1.6

Manual calculation of the sum of the core factor and secondary factor for each character.

PT IVS Express (T3) = 3
PT Taxas Integrasi (T3) = 4

Table 32 contains an example of grouping the weights of the collateral criteria gap values.

Table 32. Grouping of the Collateral Criteria Gap Values

No	Shipper's Name	(K7)	(K8)	CF	SF	T1
1	PT IVS Express	3	3	3	3	3
2	PT Taxas Integrasi	5	4	5	4	4.6

Manual calculation of *Collateral* of CF and SF:

PT IVS Express (CF) = 1.8
PT Taxas Integrasi (CF) = 3
PT IVS Express (SF) = 1.2
PT Taxas Integrasi (SF) = 1.6

Manual calculation of the sum of the core factor and secondary factor for each consignee.

PT IVS Express (T4) = 3
PT Taxas Integrasi (T4) = 4.6

Table 33 contains the grouping of the gap values for the condition of economy criteria.

Table 33. Gap Value Grouping of Condition of Economy

No	Shipper's Name	(K9)	(K10)	CF	SF	T1
1	PT IVS Express	3	3	3	3	3
2	PT Taxas Integrasi	5	4	5	4	4.6

Manual calculation Condition of Economy Calculation of CF and SF:

PT IVS Express (CF) = 1.8
PT Taxas Integrasi (CF) = 3
PT IVS Express (SF) = 1.2
PT Taxas Integrasi (SF) = 1.6

Manual calculation of the sum of the core factor and secondary factor for each consignee.

PT IVS Express (T5) = 3
PT Taxas Integrasi (T5) = 4.6

6. Calculation of the sum of each principle on each consignee (starting from T1 to T5).

Table 34 contains an example of the final result of the profile matching calculation.

Table 34. Final Result of Profile Matching Process

No	Shipper's Name	T1	T2	T3	T4	T5	Results
1	PT IVS Express	3	1.4	3	3	3	2.6
2	PT Taxas Integrasi	4	4	4	4.6	4.6	4.21

Final Result of Manual Calculation of Profile Matching Process:

PT IVS Express = 2.6 (Rejected)
PT Taxas Integrasi = 4.21 (Accepted)

CONCLUSION

Based on research on PT IVS Express and PT Taxas Integration, it can be seen that the granting of receivables to PT Taxas Integration with a score of 4.21 is acceptable, but the granting of receivables to

PT IVS Express with a score of 2.6 is declined. The results of this study indicate that the profile matching method and 5c principle can be used to determine companies that are acceptable to be given company receivables in accordance with the given criteria.

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