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ASSOCIATIVE RULES FOR MODELING INTERNATIONAL SECURITY DECISIONS IN THE CONTEXT OF THE UKRAINIAN-RUSSIAN WAR. PRELIMINARY EVALUATIONS

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Abstract

Research background: By launching a war against Ukraine, Russia changed the entire world system and demonstrated the ineffectiveness of the global security system. Today it is necessary to look for effective solutions to support the adoption of security decisions and develop effective strategies for the formation of a new architecture of the international security system.
Purpose: The paper aims to obtain preliminary approximate estimates of the state commitments of the countries of the world that support Ukraine in the war with Russia and to reveal non-obvious connections and regularities in the provision of various types of aid.
Research methodology: The data were collected on the rough refugee cost estimate, quantitative assessment of the government-to-government commitments, and preliminary data on non-bilateral aid transferred by governments to Ukraine of 40 countries. We used the FP-Growth algorithm to identify non-obvious connections and patterns between different types of support for Ukraine.
Results: We created an associative rules model to detect non-obvious patterns and relationships between the different types of bilateral commitments of the countries, that support Ukraine.
Novelty: Preliminary estimates were obtained between various types of international support for Ukraine in the war against Russia covering February 24 to November 20, 2022, the number of Ukrainian refugees accepted by the respective countries, and the sale of arms to Russia by some of them after the ban.

Keywords: international security, Russian-Ukrainian war, Ukraine support, association rule, FP-Growth

JEL classification: C52, C59, K42

Introduction

The modern world with its complex patterns and interrelationships has become difficult to understand the problems of global security (Ivančík, Necas, Jurčák, 2014). It is especially incomprehensible to realize that in a highly technological society, which is solving the problems of global climate change and struggling with the consequences of the COVID-19 pandemic (Bieszk-Stolorz, Dmytrów, 2021, 2020), a country that was considered one of the dominant ones on the international scene, owner of the "second army in the world" (Ivančík *et al.*, 2014; Kovalchuk, Berezka, 2022) and the main supplier of gas to the countries of Europe and Western Asia (Kovalchuk *et al.*, 2022), started an unjustified war against a neighboring state. Russia's unprecedented invasion of Ukraine demonstrated the ineffectiveness of the world's modern security system. Even the first consequences of this war caused a global world crisis in the following spheres of the world: environment, humanitarian, economic, intercultural, political, military and security. However, the most negative effect of this incomprehensible war is the destruction of human potential. As of January 17, 2023, 7,051 Ukrainians were officially recorded as killed, including 456 children ("Russia's war crimes", 2022). Russia has also already lost more troops in the conflict in Ukraine than the US did in World War I ("Russia Has Lost More Troops in Ukraine Conflict Than US Did in First World War: Report", 2023).

After the start of Russia's unannounced full-scale invasion of Ukraine on February 24, 2022, the international community split into two parts. This happened for the first time in 40 years after the end of the Cold War. The Russian "military operation" in Ukraine caused condemnation all over the world. Many countries support Ukraine and oppose the Russian invasion. All 30 NATO countries condemn Russia for the invasion. These are Albania, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Turkey, the United Kingdom, and the United States. In addition to NATO countries, others also demonstrate their support to Ukraine in the war with Russia, in particular, Australia, Canada, Finland, Japan, New Zealand, South Korea, Switzerland, and Taiwan (Kanak, 2023). They are severing diplomatic, economic, scientific and cultural relations with Russia, imposing sanctions against Russian businesses financing the war against Ukraine, providing financial, humanitarian and military support to Ukraine, and massively accepting Ukrainian fugitives from the war. However, several countries directly or indirectly support Russia in the war with Ukraine: Belarus, Iran, Cuba, Nicaragua, Venezuela, and Kyrgyzstan. The UAE and Saudi Arabia maintain neutrality

regarding the countries participating in the War. Armenia does not notice Russia's aggressive invasion of Ukraine and voted against removing RF from the Council of Europe. India is diplomatically silent about its attitude to Russia's war in Ukraine (Kanak, 2023). The world community must draw transparent conclusions from the actions of each country and choose an effective strategy for preserving the global security balance (Radulović, Kostić, 2021). Today, the world's community needs more than ever to develop a reliable support system for management decisions (Renigier-Biłozor, 2013).

The scholarly debate on the Russian-Ukrainian conflict, which was initiated by Russia in 2014, has mainly focused on sanctions against Russia (Bachmann *et al*., 2022). C.M. Davis considered defense economic concepts related to the conflict in Ukraine and analyzed the balance of forces, military potential, conventional deterrence, economic warfare and countermeasures against sanctions from the experience of Europe in the twentieth century (Davis, 2016). Today, there is a significant gap in the economic discussion about the Russian-Ukrainian war. The works devoted to the support of Ukraine are only exceptions (Becker *et al*., 2022; Brien, Loft, 2022; Gronholt-Pedersen, 2022; Lawder, Shalal, 2022). Thus, the authors (Antezza *et al*., 2022) analyzed and quantified the scale of military, financial and humanitarian aid provided to Ukraine by the governments of the G7 and the member states of the European Union after the termination of diplomatic relations between Russia and Ukraine in the period from January 24, 2022, until November 20, 2022. Studies of such a plan are relevant because, during the last century, European security depended on economic and military policies, economic wars and sanctions, which affected the change in the balance of world forces.

1. Support of Ukraine in the Russian-Ukrainian war. Preliminary evaluations

From January 24, 2022, to August 3, 2022, Ukraine received 84.2 billion euros in intergovernmental commitments to support the war with Russia. The United States (USA) is currently the largest bilateral donor to Ukraine, although it is not the closest neighbor and partner. They allocated 44.5 billion euros or 56% of the total commitments from 40 countries supporting Ukraine. EU governments have committed a combined €11.52 billion, plus €14.24 billion from the EU Commission and another €2 billion from the European Investment Bank. According to rough estimates, in general, the EU countries, near which the war is taking place, provided Ukraine with up to 27.76 billion euros. An additional 4.5 billion euros were made up of multilateral loans and grants from the International Monetary Fund (IMF) and the World Bank. The commitments of other international organizations (UN, Red Cross) are

insignificant. According to inaccurate and incomplete estimates, they are about 57 million euros (Antezza *et al*., 2022).

The empirical base of our research is formed on the basis of the official database data "Ukraine Support Tracker", that intended to support a facts-based discussion about support by other countries to Ukraine. This database quantifies military, financial, and humanitarian aid transferred by governments to Ukraine after the end of diplomatic relations between Russia and Ukraine on January 24. It is preliminary (non-exhaustive) data on non-bilateral aid. Military assistance includes all types of weapons and military equipment alongside items donated to the Ukrainian army as well as financial assistance tied for military purposes. Humanitarian aid refers to assistance supporting the civilian population (mainly food, medicines, and other relief items). Financial assistance includes grants, loans, guarantees and swap-lines (Antezza *et al*., 2022).

In total, 40 countries that support Ukraine in the war with Russia have provided 25.06 billion euros IN financial assistance. Figure 1 presents the given donations for each of the countries.

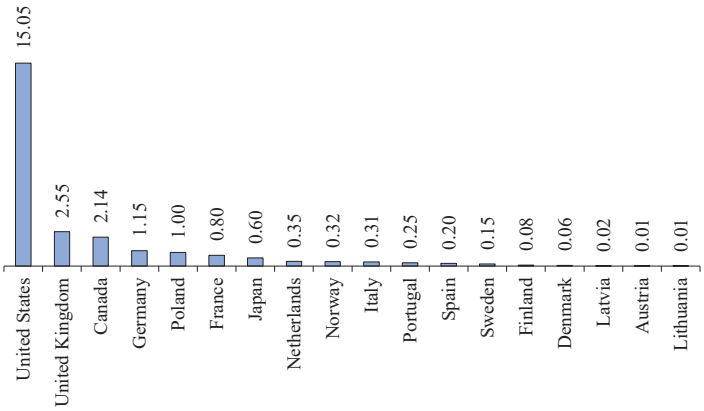


Figure 1. Financial aid (€ billion) transferred by governments to Ukraine after the end of diplomatic relations between Russia and Ukraine (covering January 24 to November 20, 2022)

Source: own collaborate based on Antezza *et al.* (2022).

Humanitarian support for Ukraine in the Russian-Ukrainian war refers to assistance to the civilian population. These are mainly food, medicines and other aid items. In total, 15.19 billion euros of humanitarian aid was provided to Ukraine. Figure 2 presents the monetary amounts of humanitarian aid provided by each country.

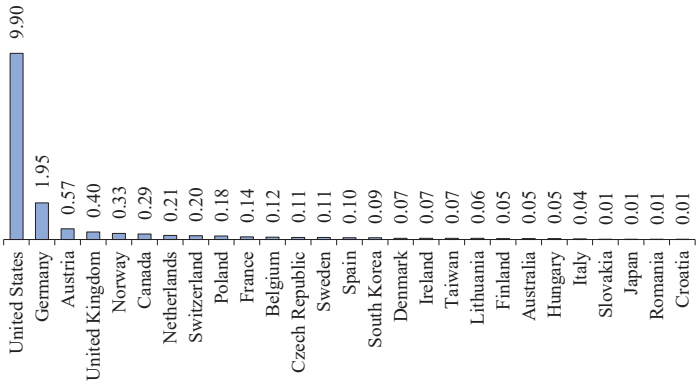


Figure 2. Humanitarian aid (€ billion) transferred by governments to Ukraine after the end of diplomatic relations between Russia and Ukraine on January 24 (covering January 24 to November 20, 2022)

Source: own collaborate based on Antezza *et al.* (2022).

After Russia's full-scale invasion of Ukraine on February 24, 2022, as of January 17, 2023, almost 8 million refugees have been recorded across Europe. Most refugees from the war in Ukraine find refuge in neighboring EU countries. However, almost 3 million Ukrainians were relocated to the territory of the Russian Federation. It is not known how many of them are there voluntarily ("Ukraine refugee situation", 17.01.23). Figure 3 shows the estimated number of Ukrainian refugees from the war by selected country ("Estimated number of refugees from Ukraine…", 2023).

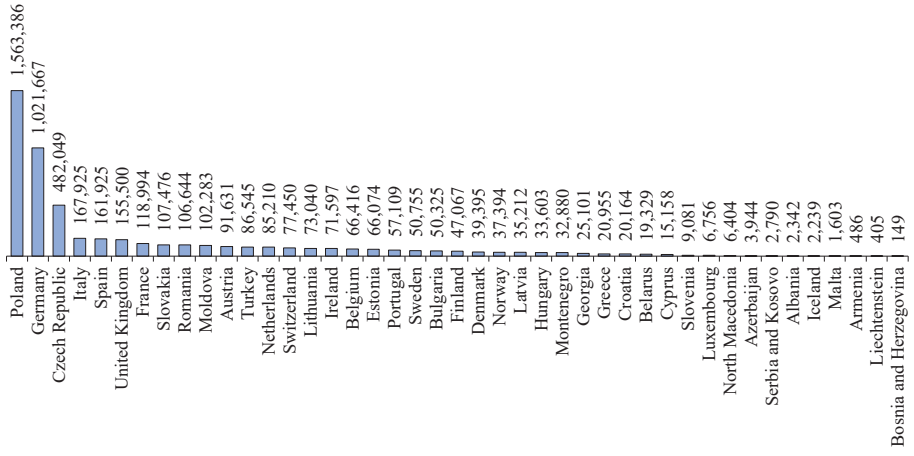


Figure 3. Estimated number of refugees from Ukraine recorded in Europe and Asia from February 2022 as of January 17, 2023

Source: own collaborate based on Statista.

19.65 billion euros were provided to support Ukrainian refugees from the war. Figure 4 presents the estimated total Ukrainian refugee costs in selected countries worldwide (in billion euros) ("Estimated total Ukrainian refugee costs…", 2023).

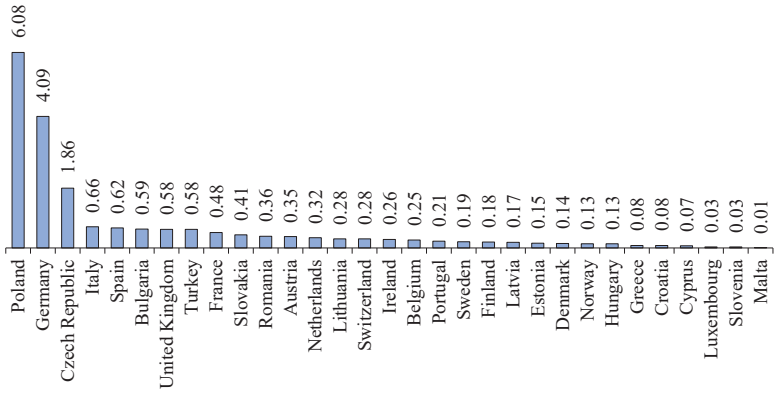


Figure 4. Estimated total Ukrainian refugee costs in selected countries worldwide (€ billion) since February 2022 as of January 17, 2023

Source: own collaborate based on Statista.

In addition to financial and humanitarian aid, the countries that support Ukraine in the war with Russia provide military support, including all types of weapons and military equipment, as well as items related to the provision of the Ukrainian army, such as fuel or food products. Military aid includes financial support related to military objectives. In particular, Sweden provided the Armed Forces of Ukraine with 48.3 million euros, Germany provided 1.2 billion euros for the purchase of weapons by Ukraine. The European Peace Fund (EPF) provided loans and grants for the purchase of arms and defense equipment worth 2 billion euros (Antezza *et al.*, 2022).

Some EU member states exported weapons to Russia after the 2014 embargo: France, Germany, Italy, Austria, Bulgaria, Czech Republic (Brillaud *et al.*, 2022). Figure 5 shows the number of weapons sold to Russia after 2014 by each of these countries.

Now they and other countries provide military support to Ukraine in the war with Russia. Figure 6 presents the monetary amounts of humanitarian aid by country.

The world economy is suffering colossal losses from the Ukrainian-Russian war, and this is not only the cost of aid to Ukraine. Many world economies depend on Ukrainian and Russian exports. For example, these countries are among the largest exporters of wheat. Russia

is turning food into a weapon in its war with Ukraine, just as it has already done with its energy sources. Threatening the risk of global famine, the Russian Federation seeks to negotiate geopolitical advantages for itself. To restore global security and maintain the global geopolitical balance, effective management solutions are necessary, which are possible only under the conditions of developing new security strategies for the development of international relations based on a scientific analysis of interstate relations and patterns.

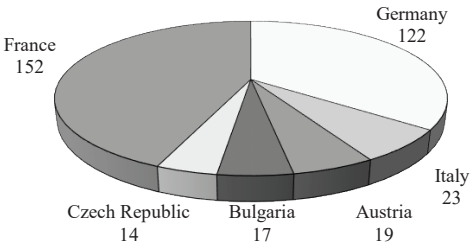


Figure 5. Arms exports to Russia by MS 2015–2020 (€ billion)

Source: own collaborate based on Brillaud *et al.* (2022).

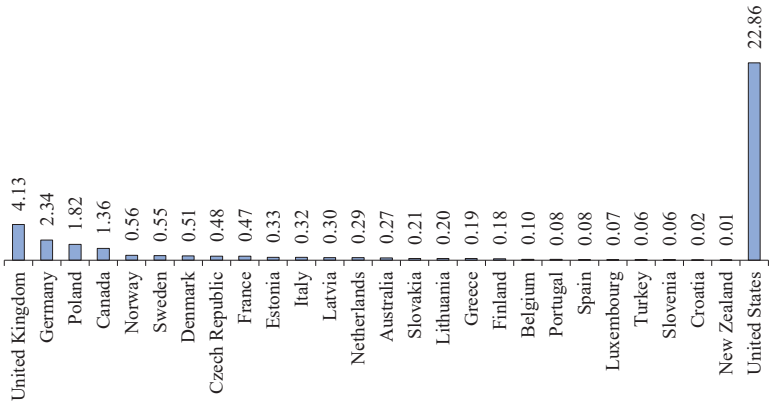


Figure 6. Military aid (€ billion) transferred by governments to Ukraine after the end of diplomatic relations between Russia and Ukraine on January 24 (covering January 24 to November 20, 2022)

Source: own collaborate based on Antezza *et al.* (2022).

2. Research methodology

Association rules are one of the most important methods in data mining (Srikant, Agrawal, 1996; Şeker, 2011). Association rules are used to detect patterns that occur frequently in the database. An association occurs when several database elements are linked to each other. At first glance, seemingly unrelated data may have hidden connections. These relationships are if-then rules. If they exceed a certain threshold, they are considered interesting. Association rules make it possible to predict patterns and behavior of data, thus helping in decision-making.

Before formulating the problem of generating association rules, let us introduce some notations and give some definitions.

Let $I = \{i_1, i_2, \ldots, i_n\}$ – set of n attributes (items), where n – is the total number of attributes.

Let $T = \{t_1, t_2, \ldots, t_m\}$ – set of transactions (database), where m – is the total number of transactions.

Each transaction from set T contains a subset of items from set I.

An association rule is an implication

$$F \Rightarrow G \tag{1}$$

where $F \subseteq I$, $G \subseteq I$.

Support determines how often a transaction appears in the database. Support F concerning T is the ratio of the number of transactions containing a subset of F to the total number of transactions:

$$Supp(F) = \frac{m_F}{m} \tag{2}$$

where m_F is the number of transactions containing set F, m is the total number of transactions.

Association rules are characterized by a confidence indicator, which indicates how often the rule is true. The confidence of the rule $F \Rightarrow G$ is the ratio of the number of transactions that include the simultaneous occurrence of the set F and the set G to the number of transactions containing set F:

$$Conf(F \Rightarrow G) = \frac{Supp(F \cap G)}{Supp(F)} \tag{3}$$

If support and confidence are large enough, probably, any future transaction containing F will also contain G.

Lift is the ratio of the frequency of occurrence of F in transactions that also contain G to the frequency of occurrence of consequent in general:

$$Lift(F \Rightarrow G) = \frac{Supp(F \cap G)}{Supp(F)Supp(G)} \tag{4}$$

or the ratio of the observed support to that expected if F and G were independent. *Lift* is a generalized measure of the connection between two datasets: at $Lift = 1$, there is no relationship (the rule $F \Rightarrow G$ does not exist), at $Lift > 1$ a direct relationship (the rule $F \Rightarrow G$ is useful for forecasting), at $Lift < 1$ the inverse relationship (F and G are substitutes for each other).

Conviction is a measure of the degree of implication of a rule. Conviction is defined as

$$Conv(F \Rightarrow G) = \frac{1 - Supp(G)}{1 - Conf(F \Rightarrow G)} \tag{5}$$

A conviction can be interpreted as the ratio of the expected frequency that F appears without G (the frequency that the rule makes an incorrect prediction) if F and G are independent, divided by the observed frequency of incorrect predictions.

When searching for interesting rules, the analyst most often determines the threshold values – the minimum support value for the analyzed sets $Supp_{\min}$ and the minimum confidence value $Conf_{\min}$.

A set F is called frequent if its reference value is greater than the minimum specified reference value:

$$Supp(F) > Supp_{\min} \tag{6}$$

A rule $F \rightarrow G$ is an association rule if it has support greater than $Supp_{\min}$ and confidence greater than $Conf_{\min}$.

After the above definitions, we now present the association rule generation algorithm, which consists of two steps:

– searching for frequent sets of items,

– formation of association rules from frequent sets.

Generating association rules is a difficult task. The first step is particularly difficult algorithmically because it requires finding all of the possible combinations of items. As the number of items in set I grows, the number of possible sets of objects grows exponentially.

The search for association rules is greatly facilitated by data mining.

3. Data selection and description

Data example contained information about the rough cost estimate of the bilateral commitments of the following 40 countries, that supported Ukraine in the War (Antezza *et al.*, 2022): United States, Germany, Poland, the United Kingdom, Canada, Czech Republic, France, Norway, Italy, the Netherlands, Spain, Sweden, Austria, Denmark, Turkey, Slovakia, Japan, Bulgaria, Portugal, Lithuania, Estonia, Latvia, Switzerland, Finland, Belgium, Romania, Ireland, Australia, Greece, Hungary, Luxembourg, Croatia, South Korea, Slovenia, Cyprus, Taiwan, New Zealand, Malta, China, and India. Data examples attributes are the following indicators (covering February 24 to November 20, 2022): refugee costs (baseline estimate), financial, humanitarian and military commitments, (in billion Euros), number of refugees and exported weapons to Russia by MS 2015- 2020 (in billion Euros). Examples are rows of the data set table containing a value of the analyzed bilateral commitments ("Total bilateral aid commitments to Ukraine…", 2023; Brillaud *et al.*, 2022).

To search for associative rules in the Rapid Miner environment ("RapidMiner, Data Mining Tools", 2022) we used the associative rule mining algorithms (Figure 7).

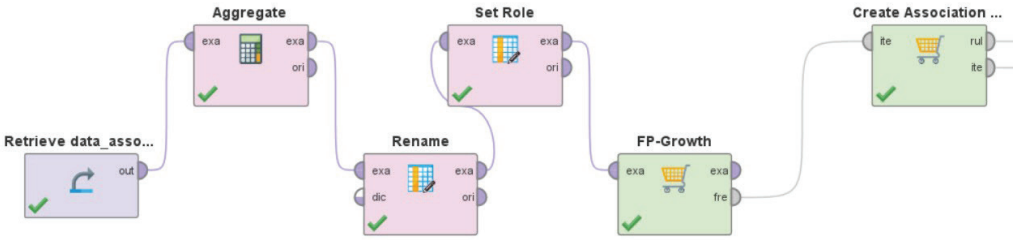


Figure 7. The operators of the association rules mining process in RapidMiner

Source: own elaboration using the RapidMiner software.

The constructed process consists of the following operators:

1. Retrieve. This operator loads a data set into the association rules mining process.
2. Aggregate. This operator creates a new example set as a result of applying the aggregation function (concatenation) to the input data set.
3. Rename. This operator renames the attribute of the input data set to which the aggregation function was applied.
4. Set Role. This operator assigns one of the data set's attributes the role of id; it will be used as a unique identifier for each example. FP-Grown. This operator defined

frequently-occurring itemsets in an input data set, and represents the data set in the tree data structure).

5. Create Association Rules. This operator detected a set of association rules from the defined set of frequent itemsets.

The data mining model was built with the following Min criterion values, which specify the criterion which is applied for the detection of association rules (Table 1).

Table 1. The criterion which is used for the selection of rules

Criterion	Min criterion value
Confidence	0.1
Lift	0.8
Conviction	0.8
Gain*	0.8
Laplace**	0.8
Ps***	0.8

* Computed by using the gain theta parameter.
** Computed by using the Laplace *k* parameter.
*** Applying to rule detection.

Source: own elaboration.

4. Results and discussion

As a result of the built associative rule mining model, the following frequent itemsets (Table 2) and the association rules (Figure 8–9) were obtained.

Table 2. Frequent itemsets (FP-Grown)

Support	Item 1	Item 2	Item 3
0.763	Refugee costs	Number of refugees	
0.553	Refugee costs	Humanitarian	
0.605	Refugee costs	Military	
0.605	Number of refugees	Military	
0.605	Refugee costs	Number of refugees	Military

Source: own elaboration using the RapidMiner software.

The developed associative rule mining model gives grounds for asserting that most often countries provide support (cash and hosting) for Ukrainian refugees fleeing the war

(support = 0.763). Also, countries often provide support (monetary and/or hosting) to Ukrainian war refugees in combination with military support for Ukraine (support = 0.605).

The following 14 association rules were identified:

Association Rules

1. [Refugee costs] → [Humanitarian] (confidence: 0.677)
2. [Refugee costs] → [Military] (confidence: 0.742)
3. [Refugee costs] → [Number of refugees, Military] (confidence: 0.742)
4. [Humanitarian] → [Refugee costs] (confidence: 0.778)
5. [Number of refugees] → [Military] (confidence: 0.793)
6. [Number of refugees] → [Refugee costs, Military] (confidence: 0.793)
7. [Refugee costs, Number of refugees] → [Military] (confidence: 0.793)
8. [Military] → [Refugee costs] (confidence: 0.852)
9. [Military] → [Number of refugees] (confidence: 0.852)
10. [Military] → [Refugee costs, Number of refugees] (confidence: 0.852)
11. [Refugee costs] → [Number of refugees] (confidence: 0.935)
12. [Number of refugees] → [Refugee costs] (confidence: 1.000)
13. [Refugee costs, Military] → [Number of refugees] (confidence: 1.000)
14. [Number of refugees, Military] → [Refugee costs] (confidence: 1.000)

Rule 1 is not strong because of confidence <0.7. Therefore, we reject it and get 13 strong rules (Table 3). All frequent sets have large confidence values. The value of the Lift indicator greater than 1 indicates the presence of a direct relationship between the variables in the selected frequent sets. Only in rule 4 (*Lift* = 0.953) is there an inverse correlation between the amount of humanitarian aid and financial support for Ukrainian refugees from the war. This can be explained by the fact that countries that are territorially distant from Ukraine prefer to provide more humanitarian aid than allocate funds for Ukrainian refugees.

Table 3. The rules sorted by maximum support value

No.	Premises	Conclusion	Support	Confidence	LaPlace	Gain	p-s	Lift	Conviction
1	2	3	4	5	6	7	8	9	10
12	Number of refugees	Refugee costs	0.763	1	1	–0.763	0.141	1.226	∞
13	Refugee costs, Military	Number of refugees	0.605	1	1	–0.605	0.143	1.310	∞
14	Number of refugees, Military	Refugee costs	0.605	1	1	–0.605	0.111	1.226	∞
11	Refugee costs	Number of refugees	0.763	0.935	0.971	–0.868	0.141	1.226	3.671

1	2	3	4	5	6	7	8	9	10
8	Military	Refugee costs	0.605	0.852	0.938	–0.816	0.026	1.044	1.243
9	Military	Number of refugees	0.605	0.852	0.938	–0.816	0.063	1.116	1.599
10	Military	Refugee costs, Number of refugees	0.605	0.852	0.938	–0.816	0.063	1.116	1.599
5	Number of refugees	Military	0.605	0.793	0.910	–0.921	0.063	1.116	1.399
6	Number of refugees	Refugee costs, Military	0.605	0.793	0.910	–0.921	0.143	1.310	1.908
7	Refugee costs, Number of refugees	Military	0.605	0.793	0.910	–0.921	0.063	1.116	1.399
4	Humanitarian	Refugee costs	0.553	0.778	0.908	–0.868	-0.027	0.953	0.829
2	Refugee costs	Military	0.605	0.742	0.884	–1.026	0.026	1.044	1.122
3	Refugee costs	Number of refugees, Military	0.605	0.742	0.884	–1.026	0.111	1.226	1.530

Source: own elaboration using the RapidMiner software.

13 important rules obtained from the interpretation of the rules are given below:

1. If the country hosts Ukrainian refugees from the war, it provides financial support to the refugees.
2. If a country provides financial support to Ukrainian refugees and military support to Ukraine, then it hosts Ukrainian refugees.
3. If the country hosts Ukrainian refugees and provides military support to Ukraine, then it provides financial support to Ukrainian refugees.
4. If a country provides financial support to Ukrainian refugees, it hosts Ukrainian refugees.
5. If a country provides military support to Ukraine, it provides financial support to Ukrainian refugees.
6. If a country provides military support to Ukraine, it hosts Ukrainian refugees.
7. If a country provides military support to Ukraine, it hosts Ukrainian refugees and provides them with financial support.
8. If a country hosts Ukrainian refugees, it provides military support to Ukraine.
9. If the country hosts Ukrainian refugees, it provides military support to Ukraine and financial support to Ukrainian refugees.
10. If the country hosts Ukrainian refugees and provides them with financial support, then it provides military support to Ukraine.
11. If a country provides humanitarian support to Ukraine, it provides financial support to Ukrainian refugees.

12. If a country provides financial support to Ukrainian refugees, it provides military support to Ukraine.
13. If a country provides financial support to Ukrainian refugees, it provides financial support to Ukrainian refugees and military support to Ukraine.

Figure 8 shows a circle graph of the created rules. Meaningful relationships of the bilateral commitments are depicted as lines with an arrow. More of them are detailed above.

Figure 9 shows a network diagram of rules created for the number of Ukrainian refugees in hosting countries. The graph visualizes the presence of connections between the number of Ukrainian refugees from the war accepted by the respective country, financial support for refugees and military support for Ukraine.

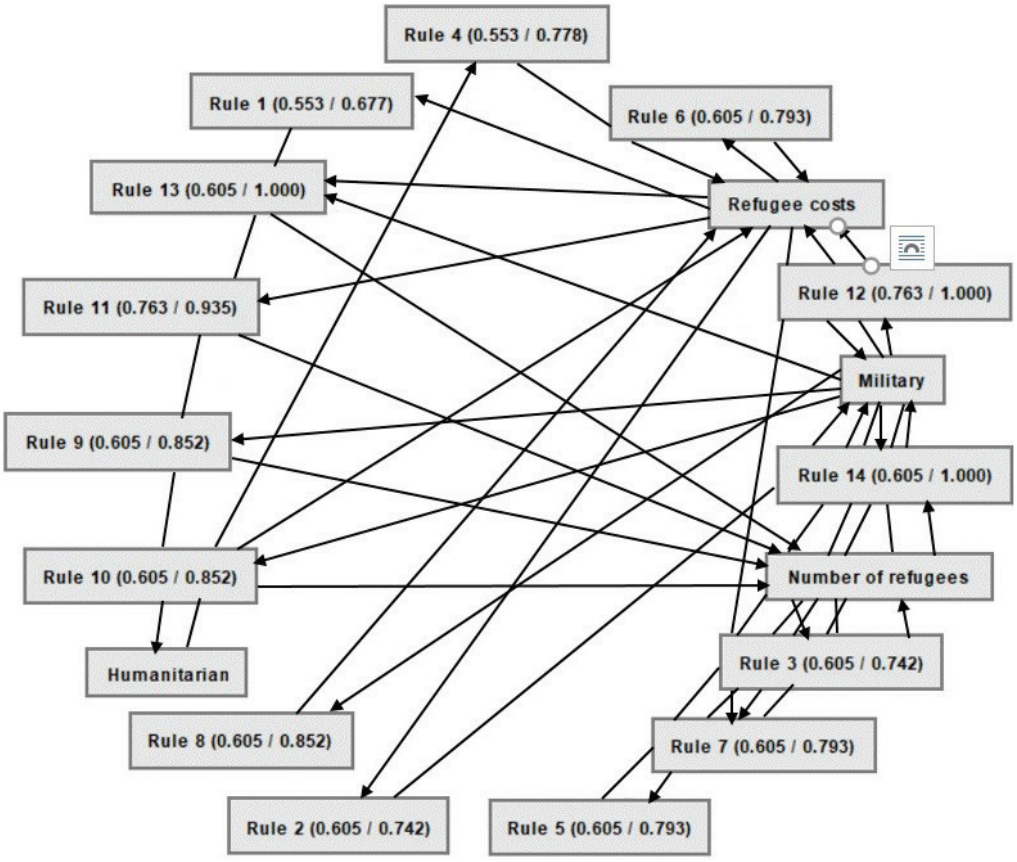


Figure 8. Drawing of rules

Source: own elaboration using the RapidMiner software.

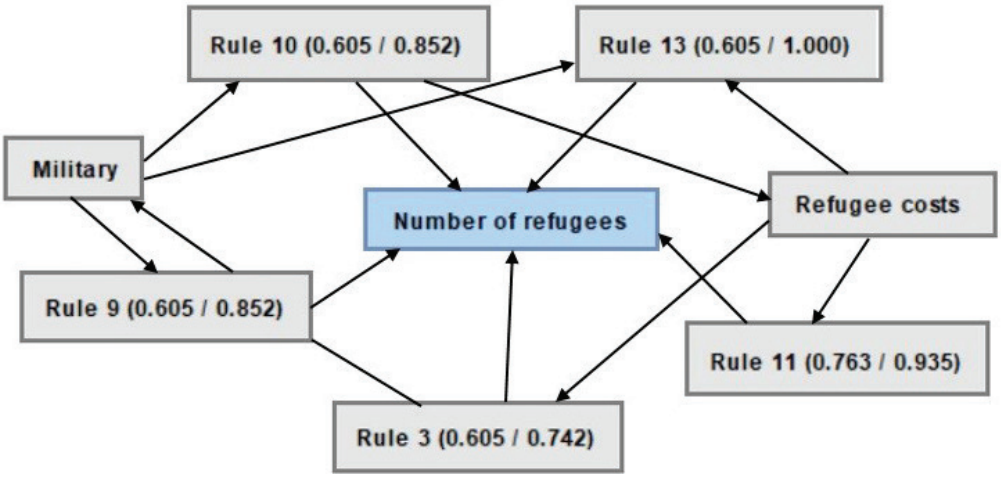


Figure 9. Graf Drawing of Rules Created for the Number of refugees

Source: own elaboration using the RapidMiner software.

Figure 10 shows a network diagram of rules created for the financial support of Ukrainian refugees from the war. The graph visually confirms the presence of previously identified connections between the number of Ukrainian refugees from the war accepted by the respective country, financial support for refugees and military support for Ukraine.

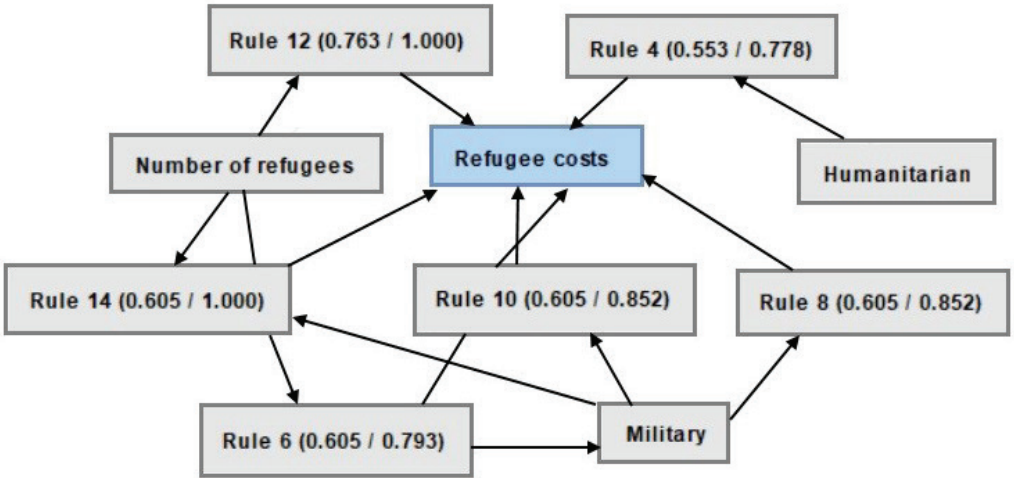


Figure 10. Graf Drawing of Rules Created for Refugee costs

Source: own elaboration using the RapidMiner software.

Figure 11 shows a network diagram of rules created for the military support of Ukraine. The graph depicted the relationship between the number of admitted Ukrainian refugees from the war, their financial support for refugees and military support for Ukraine.

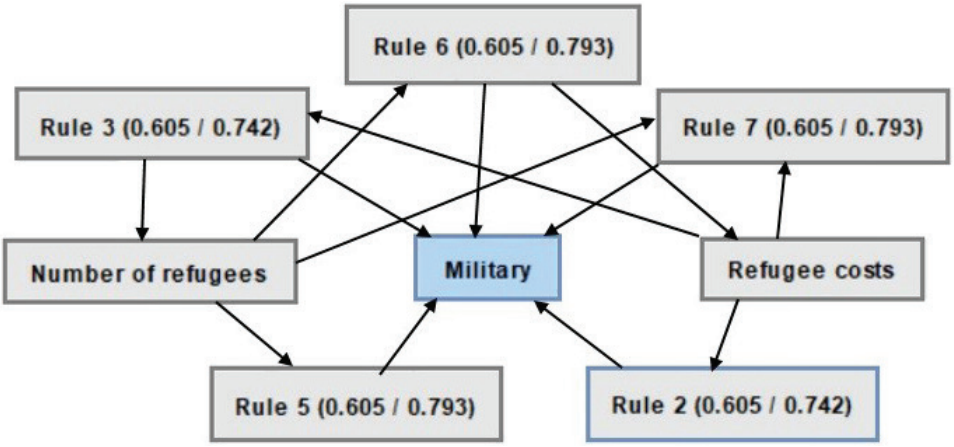


Figure 11. Graf Drawing of Rules Created for Military

Source: own elaboration using the RapidMiner software.

Conclusions

Russia's full-scale war against Ukraine has significantly changed the map of the world and will cause tectonic shifts in the perception of security, as well as corresponding changes in the mechanisms of its provision, response to the crises of various origins and their resolution. The purpose of our paper was to obtain preliminary approximate estimates of the state commitments of the countries of the world that support Ukraine in the war with Russia and to identify non-obvious connections and regularities in the provision of various types of aid. Such assistance is one of the manifestations of the reaction of the international community to the failure of the system of international law. Such assistance is one of the manifestations of the reaction of the international community to the failure of the system of international law.

Today, Ukraine not only fights for its national interests but also defends the independence of the entire world community. Therefore, many countries of the world have overestimated the geopolitical risks and support Ukraine in the war against Russia and provide it with financial, humanitarian and military assistance. We attempted to obtain preliminary estimates of aid provided by individual countries and found some interesting connections and patterns. This

study analyzed various types of bilateral commitments (humanitarian, financial, and military aid to Ukraine, aid to Ukrainian refugees from the war, and the hosting of Ukrainian refugees) of the following 40 countries, that supported Ukraine in the War, and the export of weapons to Russia by some of them by MS 2015–2020. By applying associative rule mining, we established that the fact of arms sales to Russia after the embargo was introduced did not affect their decision to support Ukraine in the War and take on significant state obligations. Connections and associative rules between the number of Ukrainian war refugees accepted by the respective country, financial support for refugees, and military support for Ukraine were revealed. This means that most of the countries that actively receive and support Ukrainian refugees in the war also provide significant military support to Ukraine. Russia's full-scale invasion of Ukraine is a threat to global humanitarian, food, climate and energy security. Prolonged wartime may cause another refugee crisis. The provision of significant support to Ukraine by the partner countries can significantly reduce negative consequences for the international community and the cost of victory in this war not only for Ukraine. The obtained results can provide important information to the governments of the states for the formation of a modern perception of global security and the development of effective security policy strategies.

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