

Value Modeling of Foreign Military Sales

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Abstract: The foreign military sales (FMS) process serves several purposes: reinforcing alliances, maintaining continuous production of military goods, and lowering unit costs for the United States. This study evaluates the FMS process and its benefits by creating a value-based dashboard. This was achieved by creating a value hierarchy to establish factors that are important in evaluating the value of FMS. Next, rating criterion and weights were established to create a value score for each value measure. Although this research focuses on the sale of Sikorsky UH-60 Black Hawk helicopters, this methodology is meant to serve as a framework for capturing the value of other FMS products.

1. Introduction

Frequently, the office of the Deputy Assistant Secretary of the Army for Defense Exports and Cooperation (DASA-DE&C) must respond to inquiries from Congress and the Department of Defense concerning the return on investment of the Army's Foreign Military Sales (FMS) program. The effects and impacts of FMS range from the tactical to strategic levels. At the strategic level, FMS enables coordination between the US and its partners and strengthens mutual security. It is present across the spectrum of Army acquisitions and benefits not only our foreign partners through increased capacity and interoperability with the US, but also US Army readiness through enhanced interoperability, production economies of scale, and support of both the organic and national industrial base. Thus, the team developed a problem statement to better identify the challenges DASA-DE&C faced regarding foreign military sales. Because of the wide-ranging effects of FMS and the spectrum of functions that it operates in, creating value measures by consolidating the benefits and linking the functions will allow for a complete understanding of the effects and return on investment of the Army's FMS mission.

1.1 Background

The Foreign Military Sales (FMS) program is a tool used by the United States Government to fulfill foreign policy goals. The FMS process is divided into three main stages: Pre-Case Development, Case Development, and Case Implementation and Execution. The Pre-Case Development phase starts with the Pre-Letter of Request (LOR) activities which include supplying information on what is required in a LOR and assistance in selecting the defense articles, training, and services that will build partner capacity. The process creates this total package approach to work with the customer (country that purchases equipment) through the FMS process and ensure that everything is conducted smoothly. The LOR outlines what the customers will receive, which the customer country's representative will approve. The President is required to establish an End User Monitoring (EUM) program to ensure accountability of these purchasing countries with the US military items. Along with the different munitions and systems the US sells as a part of its FMS process, there are also training opportunities and education on the equipment sold and soldier skills. The overall FMS process makes the US military more compatible with their allies.

Today Foreign Military Sales provide many advantages to meeting the Army's readiness, as defined by the Joint Staff. When Foreign Military Sales are conducted, there is an opportunity for an international partner contract, which can benefit the built-in interoperability of our Army's readiness, by supplying foreign countries with the same equipment the US uses. The Defense Security Cooperation Agency (DSCA) has trained roughly 31,000 foreign military students, allowing the United States to create long-term relationships. It is important to note that not all Foreign Military Sales will lead to benefits; strengthening

a country with opposing goals as the US could damage readiness and pose a security threat. The Department of State uses specific criteria to determine whether a country can purchase equipment from our government. Other aspects to consider in Foreign Military Sales is how the US process compares to foreign nations conducting military sales, precisely how it compares in cost, and whether allied nations would shift to different sales processes due to cost savings. Foreign Military Sales also boost the US economy and provide stable jobs for Americans by continually keeping a production line running to produce US military equipment and weaponry.

In order to understand how FMS affects US national security goals, the national security goals need to be identified. The National Defense Strategy (NDS) claims that there are three distinct lines of effort the US must pursue in the interest of our national security goals. The first is "rebuilding military readiness as we build a more lethal Joint Force." The second line of effort has already been addressed to strengthen alliances. The third line of effort is "reforming the Department's business practices for greater performance and affordability" (Mattis, Summary of the 2018 National Defense Strategy of The United States of America, 2018). A peripheral benefit is interoperability, when empowering other nations by supplying them with the same weapons that the US military utilizes. The integration of more modern weaponry in the form of small arms weaponized vehicles and more bolster the effectiveness of US allied nations, especially given that several of the United States' allies are severely lacking in terms of war technology.

2. Methodology

The Systems Decision Process (SDP) model is a snapshot of how systems engineers solve real-world problems such as the FMS problem described above. The SDP consists of four phases that each have three primary functions. Each phase refers to the other using a feedback loop, and no phase starts without understanding the problem and confirming that understanding with stakeholders.

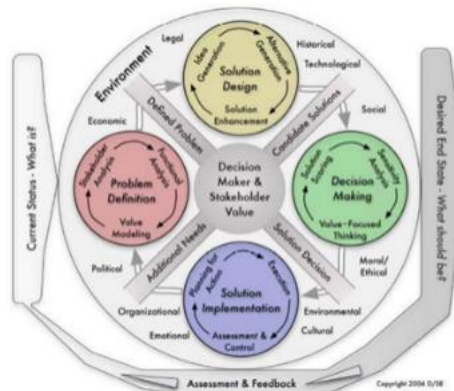


Figure 1. Systems Decision Process (SDP) Diagram

The team began the Problem Definition phase with research and literature reviews regarding the FMS process, Army Readiness as it relates to FMS, and National Security goals as they relate to FMS. The literature reviews gave the group a better understanding of the project's purpose. These led to the creation of the value hierarchy, which will be used throughout the project. From the literature reviews, the team conducted stakeholder analysis with various clients either contributing to FMS or where FMS contributes to their organization. These meetings ranged from Army PEO Aviation to Vice President of Global Trade Compliance (Army leaders to industry leaders). This was vital in developing the value hierarchy discussed below and refining it based on information gained from meetings with individuals and organizations who are involved or influenced by the FMS process.

2.1 Functional Hierarchy

Throughout stakeholder analysis, the team developed a functional hierarchy analysis seen below. This tool allowed the team and its stakeholders to better understand the problem and visualize how the problem structure.

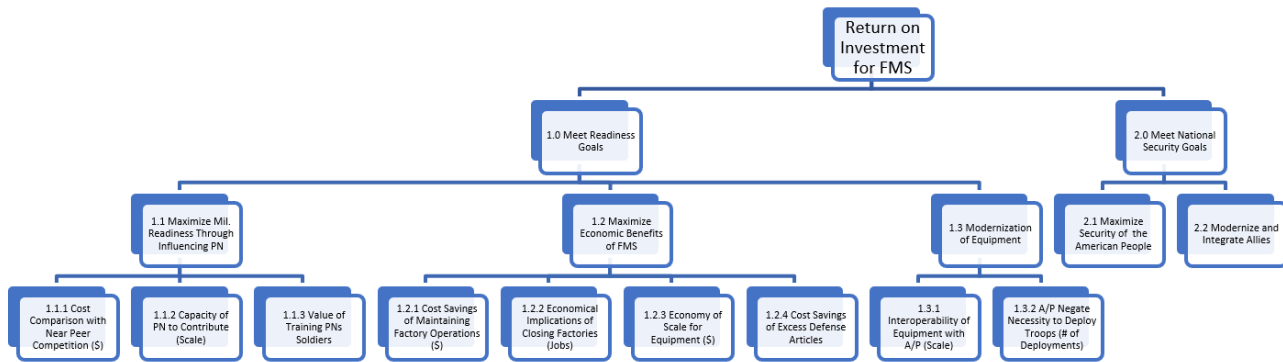


Figure 2. FMS Value Hierarchy and Return on Investment

The Value Hierarchy begins with the Functional Objective that was given by the project’s stakeholders, which is the Return on Investment of the Foreign Military Sales process. The project team broke the values of the process down into smaller, more measurable pieces to better tackle the challenges of FMS, as laid out from the initial stakeholder analysis. With the functional objective broken down, it is possible to examine them and decide the best way to measure each of them in ways that may or may not involve money.

Next are the value functions of functional hierarchy: Meet Readiness Goals (1.0) and Meet National Security Goals (2.0). These functions were decided based on analysis of strategic goals of the nation designed by the President, the Secretary of Defense, and the Army. Each of the groups that are heavily invested in the FMS processes’ outcome are interested overall in how it will affect the ability of the nation to meet the two functions described above. Based on the scope of the project and guidance from stakeholders, the team focused on research and data relating to how FMS allows the Army to meet its readiness goals.

Below the functions are the objectives, designed to target different aspects of the functions listed above. These include Maximizing Military Readiness Through Influencing Partner Nations (1.1), Cost Savings of Maintaining Factory Operations (1.2), and Modernization of Equipment (1.3). These objectives were discussed and modified based on stakeholder analysis with specific stakeholders relating to each objective. The team will discuss one objective in detail to give a greater explanation of how the functional hierarchy further broke down the functional objective of the project: FMS’s return on investment.

Since Maximizing Military Readiness Through Influencing Partner Nations (1.1) is impossible to quantify by itself, value measures were created to better understand and quantify using data that will more easily explain the return on investment of FMS. The first value measure in Maximizing Military Readiness Through Influencing Partner Nations (1.1) is the Cost Comparison (1.1.1) between the products offered in FMS and the closest near-peer alternative. This measure was determined because the ability of partner nations to purchase these products is heavily dependent on the cost of them. If a near-peer can sell something that is of about the same quality (or even of worse quality) but much cheaper, partner nations may be more willing to purchase from someone else. This would have a negative impact on the US’s ability to influence its partner nations, so it is a part of our measurement process. The second value measure under Maximizing Military Readiness Through Influencing Partner Nations is the capacity of a Partner Nation to contribute (1.1.2). The ability of a partner nation to contribute to the US’ overall readiness is a key part of the sales in FMS. The goal of the nation is to improve its readiness, so it needs to have partner nations that can contribute to that readiness. This value measure allows the team to understand what countries would add the most to that improved readiness. To better understand how each value measure was broken down to further levels, Maximizing Military Readiness Through Influencing Partner Nations (1.1) will be used specifically.

One of the most important value measures was the capacity of a partner nation to contribute to the military security and be a beneficial partner to the United States. Several factors of a nation’s capacity to contribute could give an adequate measure for how the US value’s different countries.

The first factor was the amount of time the partner nation has been in a partnership or allied with the United States. This was measured by analyzing the duration of the partnership between the partner nation and the United States, in years. The importance of this factor is to show the value difference to the US between selling defense articles through FMS to some long, well-tested, strategic partner, and a new partner that has just begun working with the US To calculate the value score, the ‘time of alliance’ factor was given a weight of 60/100 because this factor was important from stakeholder analysis. The data used to determine the ‘time of alliance’ was from the Office of the Historian, and the time was calculated by taking the present time and subtracting the year that the United States began diplomatic relations with that particular country (Office of the Historian, 2020). This measure accounts for breaks in relations as well, it only takes the time from the most recent establishment of

diplomatic relations. This value also accounts for countries that the United States does not currently have diplomatic relations with like Russia or Syria. Stakeholders emphasized that continued partnership with countries and forming long-lasting bonds is very important to the Foreign Military Sales process and certainly one of the largest rewards of the program.

The second factor that is important to measuring partner capacity is their proximity to the United States' military adversaries. The data used in this factor was from an online data repository that measured the distance, in kilometers, between capital cities of different countries (Distance Between Capital Cities, n.d.). The best way this proximity factor could be measured was by measuring the distance in miles between the capital of the country being analyzed to the capital of the adversary being analyzed. For example, the United States would gain more value from the sale of defense articles to Poland due to its proximity to Russia rather than selling those same defense articles to Spain. This is because of Poland's strategic location near Russia and their ability to have military influence and effect close to Russia's borders as opposed to Spain's greater distance to Russia. However, this factor was weighted a 10/100 because while important, proximity is not as important as in the past with the emergence of long-range weapons or remote capabilities of some countries' militaries. Another example, of how proximity is not an extremely important factor is that often, long standing relationships and partnerships are much more important despite the lack of proximity to an adversary. An example of this is the United States' relationship with the United Kingdom. While the UK is not near Russia, China, or any other adversaries, the US gains much more military value from a continued relationship with them rather than a country that is closer in proximity.

Another factor considered in this value measure was the stability of a partner nation. To determine the stability of a partner nation, an aggregation of Freedom House's Global Freedom Score and the Fragile States Index was used to create a value that accounted for the stability of a partner nation. Freedom House's Global Freedom Score was created by considering a country's "electoral process, political pluralism and participation, the functioning of the government, freedom of expression of belief, associational and organizational rights, the rule of law, and personal autonomy and individual rights (Freedom House, 2021). This Freedom Score is a good measure of a nation's stability because it assesses the political and social factors that affect the freedoms of the people of that nation. By using this freedom score, the likelihood for a revolution or extreme fracture between the government and the people can be gauged, therefore making it a good indicator of the stability of the country. The Fragile States Index is a measurement that accounts for pressures that would lead a government to be weak or fragile, for example, resource availability, corruption, and economic stress (The Fund for Peace, 2021). These independently gathered and researched scores were combined by putting them on the same type of scale, meaning a higher score would mean that the country is less stable. A macro-enabled function in Microsoft Excel was used to convert the stability score to a score from 0 to 100 using interpolation. This specific measure has a weight of 40/100 in the total capacity to contribute score because it is a good indicator of the level of trust the United States can put into this partnership and if their government would be reliable for years to come.

Through considering the capacity to contribute, the study determined the amount that a country spends on its national defense has an impact on the reliability of that partner. This factor stemmed from the percentage of the potential partner's GDP that was most recently spent on defense. The study gathered data from the Stockholm International Peace Research Institute that was provided on the World Bank website (Stockholm International Peace Research Institute, 2020). The potential partner's GDP used in this study was gathered from averaging the data of GDP spent on defense from 2001 to 2020. The macro-enabled function in Microsoft Excel was used to represent the country's GDP on a scale of 0 to 100. This measure also had a weight of 40/100 in our total capacity to contribute score because it helps demonstrate the potential partner's priority level in defense expenditure.

The final factor that contributed to the capacity to contribute score was the partner or potential partner's influence in their geographic region. The data for this regional influence comes from US News' Most Influential Countries list (US News, 2021). Each country was ranked by five attributes: leader, connection to the rest of the world, influential culture, politically influential, and strong international alliance (US News, 2021). The attributes of being politically influential and having a strong international alliance highlight a country's ability to influence its geographic region through both its diplomacy and its military. For this reason, this measure is the foundation of the influence score with regards to Foreign Military Sales. Based on the ranking, each country that was being evaluated was placed on a one to five scale of most influential to least influential. Countries were ranked on a one to five scale, with five being a high influence and one being low. The purpose of this ranking is to value countries that have more influence within their region i.e., Country A has a higher influence in the European theater than Country B, therefore Country A would provide a higher score and be of more use as a partner in this situation. This factor was the most heavily weighted in our capacity to contribute score, earning an 80/100, because partnering with countries of high influence has the highest return on investment for the United States.

3. Results

The results of this study are conveyed through a dashboard (Figure 3) that relies on user inputs. Currently there are only two competitor options and one system option to choose from, but in future work this could be easily expanded. The user can pick which options to enable to see the top ten countries that provide the most value to the United States with a bar chart that compares the results. The FMS selector option cuts out all sales that are made by other states if set to 'No' and allows the user to see the differences in values based on if the United States keeps this trade open. Selecting 'Without FMS' would impact other sections of the dashboard, such as keeping factories open and economy of scale. This is shown on the dashboard by switching between having 'FMS' set to 'Yes' or 'No.' If the system or adversary selector is changed, the data on each tab that is referenced will update the data corresponding to that country or system to get the results on the dashboard. Through this model, the user can enter desired weights and values in the individual tabs described in the functional hierarchy section to produce the resulting overall values on the dashboard. These values can be used to analyze which countries would provide the most value as well as the overall value of the FMS process to the United States. This allows the user to decide with which countries they should focus on building relationships as well as data to how FMS provides value to the United States overall.

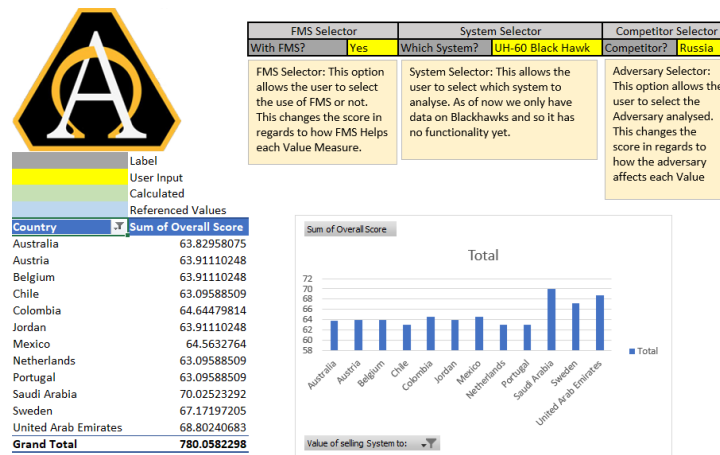


Figure 3. Snapshot of FMS Dashboard

In all cases, it is apparent that there is definite value created while utilizing FMS. For example, the total average value of FMS using Russia as a competitor and the Blackhawk as the product is 60.24. On the other hand, without FMS, the average value score is 6.33. There are similar results when using China as the competitor. The utilization of FMS primarily impacts two value measures: Interoperability and Economies of Scale. However, the comparison score is calculated to see exactly *how much* FMS is worth to the US, given specific inputs. For example, the value provided to the US with FMS is ten times more than without FMS, assuming Russia is the adversary.

4. Conclusion

Given the dashboard created and the results gathered, it can be concluded that FMS provides substantial value to the United States. Given a specific input, the dashboard can evaluate comparatively how much value is provided. Ultimately, the dashboard and analysis conclude that there is a strong positive relationship between the usage of FMS and the value created for the US. Further additions to the dashboard could illuminate the value provided to the US based on a wider array of inputs. For example, the user could add the name of another near-peer competitor to the potential competitor list, should one arise. Furthermore, different weapon systems could be analyzed using the framework created. Given the ever-changing nature of international relations, continued editions of the dashboard should be created to better capture the value of FMS across a wider range of inputs.

Further work analyzing the return-on-investment problem with respect to “Meeting National Security Goals” would be helpful for stakeholders to further develop the full return on investment for FMS. This capstone project narrowed its scope to solely addressing how FMS helps the US meet its readiness goals and did not fully explore the depth needed to determine how FMS helps meet National Security Goals. While there is undoubtedly overlap between the two categories, the distinction is necessary to properly scope the problem. By combining research done with this capstone with the future work of exploring the relationship between FMS and National Security Goals, the stakeholder would be able to gain a holistic view on the return on investment of FMS.

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