EFFECTIVE ASYMMETRIC WARFARE ECONOMICS WITH THE ELIMINATION OF HUMAN FACTORS ENGINEERING AND SOPHISTICATED TECHNOLOGY IN THE PROJECT MANAGEMENT AND DEPLOYMENT OF MISSILES AND DRONES IN THE 2026 IRAN/ISRAEL WAR

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ABSTRACT

In asymmetric warfare, the side with lesser military assets in quantity and quality, and which is technologically inferior, employs methodologies in which much less expensive and low technology weapons can be highly effective against the other side. The objective of these methodologies is to weaken the side with greater military assets psychologically and economically, which may lead to the defeat and withdrawal from the war theater due to incapability to sustain the one-sided high cost of warfare. At the time of writing of this paper, such asymmetric warfare is being demonstrated clearly by the ongoing war between Iran and Israel which started on 28 February 2026, where Iran are effectively using military hardware which cost merely a small fraction of the hardware used by the Israelis side. Iran is doing this by eliminating human factors engineering and sophisticated technology when they employ missiles and drones which lack both factors against the Israelis side which use very sophisticated and very expensive technology in their missiles and advanced technology fighter jets. If the Israelis side were able to achieve their objective or secure a winning point within a short period of time, they might not have suffered the economic impact of the asymmetric warfare, but they have failed to do so, resulting in economic suffering throughout the war. As time passes, the economic impact is becoming more critical to the point where the asymmetric warfare economics becomes the most important determining factor in the 2026 Iran/Israel War. This paper is an immediate response to the war by the authors within their field of responsibility and expertise, describing the significance of asymmetric warfare economics by evaluating and comparing the economic factors of the weapons and methodologies employed by both sides, particularly pertaining to the elimination of human factors engineering and expensive sophisticated technology by Iran in the project management, development, and operation of their missiles and drones without any prejudice.

INTRODUCTION

The ongoing 2026 Iran/Israel War started on 28 February 2026 with the failure in the negotiation between the governments of Iran and the United States of America to disarm the Iranian government of their nuclear weapon manufacturing capability although there is no clear evidence of such and the failed negotiation was just one of many series of events that might have led to the conflict, as Iran have been suffering the economic sanction led by the USA since 1979.

Iran, being under economic sanction, were forced to develop their armed forces with very limited economic capability and international collaboration since not only their military budget was very limited but so did their access to sophisticated military technology. Under those constrains, it was natural for Iran to seek low cost technology solutions for their military needs.

While under the sanction, Iran were forced to enter an 8-year war with Iraq from September 1980 to August 1988, which has also taught Iran a very useful lesson to develop asymmetric warfare capability since Iraq at that time were considered an Arab country with modern military capability and received technological support from the western countries particularly the USA.

While under the sanction too, Iran have successfully collaborated with Syria, Libya, Russia and China. There were widely available reports on the collaboration between Iran and these countries which have enabled Iran not only to survive the sanction but also developed its agriculture, infrastructures, industry and economy. These collaborations were extended strategically into the military where the 4 collaborating governments have contributed significantly to the development of low cost but highly effective missiles by Iran.

Professor Seyed Mohammad Marandi, an advisor to the Iranian nuclear negotiation team and a prominent Iranian academic who frequently voices out his opinions on Iranian geopolitical positions have admitted in widely circulated videos on YouTube that Libya and Syria have helped Iran in developing those missiles. Russia and China most probably have helped too in perfecting the “technological aspects” of the missiles including providing access for precision targeting using space or satellite technology. As for drones, which are much more low cost and low technology compared to missiles might have been developed solely by Iran with limited collaborations from Russia and China.

When the war started on 28 February 2026, Iran had already developed their asymmetric military capability particularly missiles and drones to a standard that enables them not only to defend themselves and to face the assault from Israel and the US but also to retaliate them effectively. Perhaps this is the result of a sanction that is too long to a point a country under the sanction was able to develop low cost but effective technology not only for its economic survival but also for its military capability. Of course other factors including the development in specific economics, science, technology, social and politics have contributed too.

EXTENSIVE HUMAN FACTORS ENGINEERING IN SOPHISTICATED COMBAT AIRCRAFTS

Combat aircrafts can be classified according to many types of classifications. One is to classify them as manned and unmanned combat aircrafts.

For manned combat aircrafts, human factors engineering is very significant for the safety and effective operation of the pilots and ground crews. Significant quantity and quality of technology have been invested in human factors engineering into manned combat aircrafts, ranging from the safety of the pilots through enhancement of situational awareness of the pilots, effective avionics and instrumentation for the pilots, effective control of the aircrafts and weapon systems interfaces for the pilots, artificial intelligence assistance for the pilots and effective survival system for the pilots inclusive of pressurized cockpit, bullet-proof canopy, ejection seat, parachute and emergency communication and survival kit to the effective operation of the ground crews.

Many of the technologies involve integration of mechanical, electrical and electronic engineering with physiology and psychology. These technologies are very expensive not only for their installation, integration, operation and maintenance, but also for their design, development, research and certification. Manned aircrafts are not only more complex to develop but they require more time to be tested and certified due to the human factors related safety requirements. These multiply the cost of the manned combat aircrafts significantly.

Unmanned combat aircrafts with very limited human factors are much less complex and less expensive to develop and operate, because all the human factors engineering and technologies are not required. The very limited human factors to be considered are only those pertaining to the safety and effective operation of the ground crews.

Operating a fleet of manned combat aircrafts over a significant period of time is much more complicated and expensive because not only a storage for the aircrafts is needed, but also accommodations and other accompanying facilities for the pilots. Often the facilities to accommodate the pilots are more complex and more expensive than those for the aircrafts. For example, an aircraft carrier have to accommodate not only the aircrafts, but also the pilots who require many more facilities than the aircrafts themselves due to the human factors over a significant period of time that may last up to months without refurbishment. Imagine an aircraft carrier carrying only unmanned aircrafts, how much less complex and less expensive would it be?

If there is an aircraft carrier which only carry unmanned aircrafts in the form of missiles and drones, the human factors engineering required by the aircraft carrier is only limited to the crews of the ship including those who support the operation of the missiles and drones. The aircraft carrier does not require any facility to accommodate the pilots. Without the pilot, the living quarters, briefing rooms, training and recreational facilities, health and medical facilities, and even food and beverages will be much less in quantity and quality.

This also applies for bridgeheads, which are secured positions extended into or very near the enemy territory for effective defense and attack. The bridgeheads for the Israelis side in the case of the 2026 Iran/Israel War are the American bases in Saudi Arabia, Bahrain, UAE and Qatar, which station manned combat aircrafts with fully fledged human factors engineering for the pilots.

In contemporary modern and sophisticated combat aircrafts such as F-22 and F-35 operated by the Israelis side, the human factors engineering is very extensive, very complex and very expensive because of the complex interfaces between human and sophisticated machines and technologies employed by those fighters. F-22 is the most expensive fighter. The US Air Force estimated that the flyaway cost of a unit of F-22 is USD143million, but when added the research and development plus production expenses, the cost of each F-22 reached USD350million.

There are 3 variants of F-35. Inclusive of depot maintenance, ground support equipment and spare parts, the cost for F-35A, F-35B and F-35C are USD110.3million, USD135.8million and USD117.3million respectively.

If only 10% of the cost of the fighters are allocated for human factors engineering, the estimated cost of human factors engineering is more than USD10million for each aircraft. In comparison, the unmanned Tomahawk cruise missile cost only USD4million which is less than 50% of the estimated cost of human factors engineering of the fighters.

Missiles and drones are just expendable unmanned combat aircrafts - the reason developing and operating missiles and drones is much less complicated and less expensive than developing and operating sophisticated manned combat aircrafts like stealth fighters, simply because missiles and drones only employ very minimum human factors engineering.

STEALTH FIGHTERS: THE MOST COMPLEX AND MOST EXPENSIVE SOPHISTICATED TECHNOLOGY FOR COMBAT AIRCRAFTS

At the time of writing of this paper, the Israelis side are the pact between the armed forces of Israel and the USA. The authors however label the side as “Israelis side” because obviously they go to war in the 2026 Iran/Israel War mainly on behalf of Israel for the interest of Israel.

F-35 Lightning II

The SVTOL (short take off and vertical landing) stealth fighters deployed by the Israelis side for the 2026 Iran/Israel War is the single-engine F-35 lightning II. F-35 first flew in 2006. F-35B entered service with the US Marine Corps in 2015, F-34A entered service with US Air Force in 2016 and F-35C entered service with US Navy in 2019.

Figure 1. F-35 from https://nationalsecurityjournal.org/the-f-35-has-a-double-trouble-problem-it-never-saw-coming/

F-35 is an advanced stealth fighter with stealth technologies in the aerodynamics, propulsion and coating. In term of stealth aerodynamics, all its missiles are stored internally and its fuselage and wings design disperses and minimizes the radar signature. Its propulsion is designed to minimize heat signatures. Its coating consist of radar absorbent materials baked directly into its composite skin which absorbs radar waves instead of reflecting the waves to be detected by radar. These stealth features however come at a high cost as explained in the previous section. Besides being stealth, F-35B and F-35C have SVTOL with F-35C as the CV or aircraft carrier variant for the US Navy.

Both Israel and the US Air Forces have used F-35s to attack Iran. However, although F-35s are considered to be almost impossible to be shot down with active heat seeking and radar guided missiles due to its stealth technology, by the time of writing of this paper, a couple of F-35s have been shot down or damaged by Iranian passive heat seeking missiles.

F-22 Raptor

F-22 Raptor is the air-superiority stealth fighter deployed by the Isrealis side for the 2026 Iran/Israel War. The twin-engine F-22 is faster and larger than F-35. The F-22 is capable of sustained supercruise flight at more than Mach 1.5 without afterburner, and can reach Mach 2.25 with afterburner. This very advanced fighter also have super-maneuverability with its 2 vectoring nozzles. As expected these superior capability comes with very expensive prize tag as explained in the previous section. However, at the time of writing of this paper, there is one claim that Iran have shot down or damaged an F-22.

Figure 2. F-22 from https://www.lockheedmartin.com/en-us/products/f-22.html

The authors have the opinion that a wake seeking technique can be useful to intercept stealth fighters. Wake is an atmospheric turbulence produced at the rear of aircrafts including stealth fighters when flying through the atmosphere. The magnitude and pattern of the wake is influenced by the aerodynamics and momentum of the aircrafts allowing for the production of wake signatures. Similar to radar signatures, wake signatures can be detected. In advanced cases, like radar signatures, wake signatures may allow identification of aircrafts in the future.

No Iranian Stealth Fighter

On the Iranian side, there is no report of any employment of stealth fighter although for several years before the 2026 Iran/Israel War, there were widely available but unconfirmed news that Iran were developing stealth fighters and Russia and/or China could have supplied Iran with stealth fighters. Since developing and operating stealth fighters is a very complex and expensive venture, it is a logical fact that Iran as a country under decades of economic sanction did not develop or operate any stealth fighter.

Up to this date, stealth fighters are the most complex and most expensive sophisticated technology for combat aircrafts. The asymmetric warfare as being described in this paper however have limited the effectiveness of stealth fighters.

ADVANCED ANTI MISSILE SYSTEMS

Advanced anti missile systems are being extensively fielded by the Israelis side. One reason is that both Israel and the US were very optimistic that their advanced anti missile systems will be able to protect them from any retaliatory attack by Iran. Israel and the US are well aware that Iran do not possess any capable fighters or bombers to carry air raids, and therefore depend solely on their missiles capabilities. This understanding became the basis for the type of anti missile systems deployed by Israel and the US to intercept any missiles launched by Iran. Israel deployed Iron Dome, David's Sling and Arrow as a multi-layered anti missile system, while the US deployed Patriot and THAAD to intercept the Iranian missiles.

Arrow

Arrow is the long range (more than 100km) anti missile system, meaning its missile is to shoot down Iranian missiles at a point more than 100km before the Iranian missiles reach their targets on the ground. If the path of the missile is vertical or near vertical, the interception may occur above 100km altitude in space even before the Iranian missiles release their reentry vehicles.

There are Arrow-2 and Arrow-3 system. Arrow-2 missiles are of endo-atmospheric and exo-atmospheric (within and above the atmosphere) type, while Arrow-3 missiles are of exo-atmospheric (above the atmosphere) type. Both are specializing to kill high altitude ballistic missiles.

Each Arrow anti missile system consist of a radar, command and control center and a set of launchers. Each battery may consist of 4 to 8 launchers with each launcher houses 6 interception missiles (interceptors).

Figure 3. Arrow from https://www.defensenews.com/global/europe/2022/04/06/german-air-force-banks-on-israels-arrow-3-for-national-missile-shield/

Arrow anti missile system is manufactured by Israel Aerospace Industries with Boeing, Tomer, Rafael and Elbit Systems as the subcontractors. The cost of each battery of Arrow is USD170million while each Arrow missile cost USD4million.

David's Sling

David's Sling is the medium range anti missile system, meaning its missile is to shoot down Iranian missiles at a point around and above 100km before the Iranian missiles reach their targets on the ground. David's Sling operates at a zone below that of Arrow but above that of Iron Dome.

Figure 4. David's Sling from https://militarywatchmagazine.com/article/davidssling-dominate-euro-airdefences-russia

A battery of David's Sling anti missile system is a vertical mobile launcher with 12 "Stunner" interception missiles (interceptors). It can kill ballistic missiles at up to 300km range using it kinetic energy with its speed of Mach 7.5.

David's Sling mobile anti missile system is manufactured by the Israelis Rafael Advanced Defense System and American RTX (Raytheon). The cost of each Stunner interceptor is USD1million.

Iron Dome

Iron Dome is the short range (70-100km) anti missile system, meaning its missiles are to shoot down Iranian missiles at a point less than 100km before the Iranian missiles reach their targets on the ground. If the Iranian missiles have penetrated the interception shield provided by Arrow and David's Sling, Iron Dome is to intercept the missiles.

Figure 5. Iron Dome from https://eurasianet.org/azerbaijan-announces-deal-israel-buy-iron-dome

Each battery of Iron Dome consist of a detection radar, a command and control center which determine the trajectory of the incoming missiles, and a set of launchers that launch "*Tamir*" missiles to intercept the incoming missiles. The radar will detect the incoming missiles and provide data to the command and control center (CCC). The CCC calculate and determine the trajectory and interception point and instruct the launchers to launch the *Tamir* interception missiles or interceptors. Each battery consist of 3 or 4 set of launchers where each launcher houses 20 *Tamir* interceptors. Therefore each battery may operate 60 to 80 *Tamir* interceptors which can be reloaded.

Iron Dome was developed by Rafael Advanced Defense Systems and Israel Aerospace Industries. Raytheon Rafael Area Protection System (R2S) manufactured Iron Dome at USD100million per battery.

Patriot

The MIM-104 Patriot anti missile system is the primary anti missile system deployed by the US against the Iranian missiles. A battery of Patriot consist of an advanced radar and launchers with PAC-3 MSE (Patriot Advanced Capability-3 Missile Segment Enhancement) interception missiles/interceptors.

Figure 6. Patriot from https://www.army-technology.com/projects/patriot/

The most important component of the surface-to-air missile system is Phased Array Tracking Radar to Intercept on Target or "Patriot", hence the name. Patriot is manufactured by RTX (Raytheon). The complete Patriot battery system cost up to USD1billion while each PAC-3 interceptor cost USD7million.

The PAC-3 interceptors are short range missiles that may reach 70km range. Its speed however reaches Mach 5 for kinetic energy kill. It is also a high maneuverability missile.

THAAD (Terminal High Altitude Area Defense)

THAAD or Terminal High Altitude Area Defense missile system is the intermediate range and altitude anti missile system deployed by the US to intercept Iranian missiles at intermediate range and altitude. THAAD can "hit-to-kill" missiles at 150-200km ranges. It bridges the gap between Patriot and Aegis BMD (Ballistic Missile Defense).

The primary contractor of THAAD is Lockheed Martin. The cost of a complete THAAD anti missile system may reach USD1.8billion while a THAAD interceptor may cost up to USD15million.

THAAD interceptors are very fast. They can reach hypersonic speed of Mach 8.2 or 10,000km/h to intercept ballistic missile at altitudes above 100km.

Figure 7. THAAD from https://www.armyrecognition.com/news/aerospace-news/2026/u-s-moves-to-quadruple-production-of-seekers-for-thaad-anti-ballistic-missile-defense-interceptors

Aegis BMD (Ballistic Missile Defense)

Typically Aegis BMD (Ballistic Missile Defense) are operated by the US Navy from their destroyers and cruisers. Aegis equipped destroyers and cruisers employ vertical launch system of SM-3 exo-atmospheric interception and SM-6 terminal phase defense.

Figure 8. Aegis BMD from https://nationalinterest.org/tags/aegis-ballistic-missile-defense-system

The SM-3 missile can destroy short, medium and long range missiles including ICMBs (intercontinental ballistic missiles) in space (above 100km from sea level), providing the first layer of anti missile protection to the Israelis side. The most advance version, SM-3 Block IIA may cost up to USD27.9million per unit.

The SM-6 missile may exceed the speed of Mach 3.5 and reach a distance of 460km. It is designed to intercept cruise missile at long distances and high altitudes. A unit generally cost USD4million. Both SM-3 and SM-6 missiles for Aegis are manufactured by RTX (Raytheon).

Tomahawk

The BGM-109 Tomahawk is the primary land attack missile deployed by the US against inland Iranian targets. Tomahawk is a turbofan powered subsonic (Mach 0.75) terrain following missile with TERCOM (Terrain Contour Matching). It flies very low (30-90m from the ground) to avoid radar detection.

Tomahawk now is a notorious missile after it had hit Shajarah Tayyebeh Girl Elementary School in Minab, southern Iran, killing 175 people including more than 100 elementary girl students.

Figure 9. Tomahawk from https://www.youtube.com/watch?v=ETPxZR5QOj0

Tomahawk cruise missiles are typically launched from ships and submarines. They are manufactured by RTX (Raytheon). Its cost per unit missile is USD4million.

MISSILES AND DRONES: ENPENDABLE COMBAT AIRCRAFTS WITH MINIMUM HUMAN FACTORS ENGINEERING AND LIMITED BUT PRACTICAL SOPHISTICATED TECHNOLOGY

Missiles and drones can be considered as expendable combat aircrafts with minimum human factors engineering and limited but practical sophisticated technology. The most important feature is they are unmanned and therefore do not require all the complex and expensive human factors engineering as required by the manned combat aircrafts.

Very relevant to a country under decades of economic sanction (more than 45 years), Iran did not develop complex and expensive missile systems. What they did under the sanction were reverse engineering of battle proven missiles into cost effective missiles with limited but practical sophisticated technology. Iran's most advanced missiles are *Khorramshahr-4*, *Fattah-1* and *Fattah-2*, *Sejjil* and *Kheibar Shekan* while their *Shahed* series drones are very cost effective.

Khorramshahr-4

The most powerful missile developed and operated by Iran is *Khorramshahr-4*. It is a medium range ballistic missile capable of carrying 1500-1800kg warhead for a distance more than 2000km to reach any target within Israel.

Figure 10. Khorramshahr-4 from https://wanaen.com/khorramshahr-4-enters-irans-missile-cities-sending-a-new-deterrence-signal/

Khorramshahr-4 is hypersonic ballistic missile. It can reach Mach 16 (16 times the speed of sound) at high altitude (in exo-atmospheric flight) and Mach 8 in endo-atmospheric flight. It is liquid fueled, therefore takes longer time (12 minutes) than solid fueled missiles to prepare for launch. It uses MaRV (Maneuverable Reentry Vehicle) to evade interception by anti missile systems. The cost of *Khorramshahr-4* is estimated at USD8million per unit.

Khorramshahr-4 and other ballistic missiles can carry cluster warhead that can disperse 80 submunitions to overwhelm and bypass anti missile systems. These cluster warheads have greatly reduced the effectiveness of the Israelis side anti missile systems.

Fattah-1 and Fattah-2

Fattah-1 and *Fattah-2* are hypersonic ballistic missiles capable of reaching the speed of Mach 13 and Mach 15 respectively. *Fattah-1* can reach a target 1400km away. Since the shortest distance between Iran and Israel is 1200km, *Fattah-1* can hit selected targets in Israel. *Fattah-1* is solid fuel missile, therefore it takes very short time to launch.

Fattah-2 is more advanced than *Fattah-1* that it has greater range and equipped with HGV (hypersonic glide vehicle) for enhanced maneuverability and precision. The HGV allow *Fattah-2* to glide and maneuver in endo-atmospheric flight to evade interception by anti missile systems. The HGV is liquid fueled because liquid fuel allows control of propellant feeds for maneuverability. The cost of *Fattah-2* HGV is estimated at USD200,000 per unit only. The HGV is perfect to hit hardened targets such as strategic underground concrete command centers and bunkers. *Fatah-2* most probably is the most advanced Iranian missile.

Figure 11. Fatah-2 with HGV from https://www.youtube.com/watch?v=Z3Em5_ZEr0I

Sejjil

Sejjil is a 2-stage rapid deployment solid fuel surface-to-surface missile with a range of 2400km allowing it to hit Israelis cities along the Mediterranean Sea. It is equipped with MaRV (Maneuverable Reentry Vehicle) to evade interception missiles during reentry. Its reentry speed is Mach 5.

Figure 12. Sejjil with MaRV from https://interestingengineering.com/military/iran-sejjil-dancing-missile

Kheibar Shekan

Kheibar Shekan is a hypersonic ballistic missile capable of Mach 12 exo-atmospheric flight. It can carry more than 1000kg warhead to targets at the range of 1450km. It is equipped with MaRV to evade interception missiles. The estimated cost of a *Kheibar Shekan* is USD1million.

Figure 13. Kheibar Shekan with MaRV from https://voi.id/en/news/561958

Majid

Majid is a short range anti aircraft defense missile system employing electro-optical or infrared sensors (passive heat seeking) to track targets, bypassing traditional radar, a method effective to lock on stealth fighters.

Majid became famous after its missile damaged an F-35, which was the first ever score by a missile in combat situation over a stealth fighter. The downing of the F-35 was not only a great economic impact to the Israelis side but also a great psychology impact to them as the F-35 and stealth fighters are no longer viewed as “invisible and untouchable” by missiles.

Each battery of Majid carry a launcher of 8 AD-08 ready-to-fire passive infrared homing missiles. Each AD-08 missile is estimated to cost at USD100,000.

Figure 14. Majid from https://militarywatchmagazine.com/article/iran-majid-heat-seeking-take-out-f35

Majid and all Iranian missiles are fired from mobile platforms ranging from small trucks to multi-wheeled giant trucks. This mobility enable rapid deployment of the missiles and the missiles to be protected and hidden when not in use.

Other Iranian Missiles

Iran have developed more than 20 type of missiles. They range from 75km to 3000km. Some are equipped with MaRV and HGV.

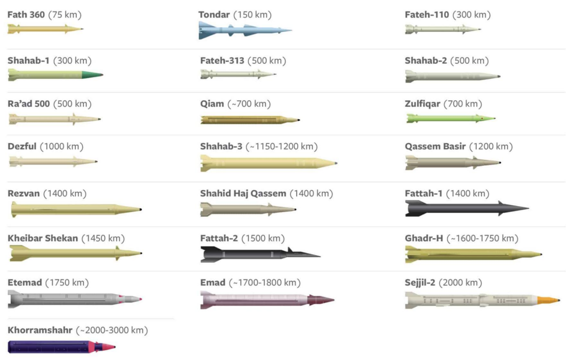

Figure 15. Iranian Missiles from https://www.fdd.org/analysis/2026/02/28/what-ballistic-missiles-does-iran-have-in-its-arsenal/

Shahed Series Drones

Shahed series delta wing drones are very cost effective unmanned aerial combat vehicle and loitering munitions. *Shahed* drones are launched using a small disposable rocket booster fitted under the fuselage. Once airborne, the booster is jettisoned and a piston engine takes over as propulsion until they reach the predetermined targets. With relatively large delta wing, the drones are highly maneuverable.

Shahed-131 is a smaller drone with a range between 700 to 900km, while Shahed-136 has a range of 2000km or more. The drones are modular, therefore many series can be expected to be developed in the future. A rocket or jet powered or electric propulsion variant may even be possible.

Figure 16. Shahed from https://nationalinterest.org/blog/buzz/russia-receives-enhanced-shahed-drones-from-iran-mc-120425

The cost of each Shahed drone is between USD20,000 to USD50,000 only. Its very low cost is its main advantage enabling Iran to employ them in large numbers per wave of attacks to overwhelm Israelis and the US defenses.

PROJECT MANAGEMENT AND DEPLOYMENT OF MISSILES AND DRONES

The lectures given by Professor Seyed Mohammad Marandi in YouTube videos which were widely circulated, indicated that the success of the Iranian missiles development program can be considered a result of a successful project management. As informed by him, the embryo missiles were Scud missiles provided by Libya and Syria.

While many Iranian neighboring countries supported Iraq during the Iran/Iraq War (1980-1988), Libya and Syria provided Scud-B missiles to Iran in 1984 and 1986 respectively. The Iranian have reverse engineered the missiles to produce better missiles though a well planned and executed project management.

The 2 most important elements of this project management were *istiqamah* (endurance) and cost effective under sanction (very limited resources and international collaboration), as Iran were at war and under international economic sanctions. The well managed project saw the increment in range from 300km of the Scud-B missile to 2400km of Sejjil missile within 20 years only (1988-2008).

For decades before the 2026 Iran/Israel War, there were widely circulated YouTube videos of "leaked" Iran 5th generation stealth fighter development program to a level that it was widely believed that Iran were developing the advanced fighter. Prior to that, the world had seen Iran had successfully extended the operational life of F-14 Tomcat fighters acquired in the 70s during the Shah regime well into the 2000s, which only strengthen the belief that Iran was venturing into a 5th generation fighter development as the replacement of their Tomcats.

For a country under economic sanction with very limited resources and international collaboration, developing a 5th generation fighter requires concentration of local resources that a parallel development of missiles was not possible. However, in reality, Iran did not develop the 5th generation fighter, instead it did develop many advanced missiles.

Clearly the Iranian military development authority have understood the real situation where for Iran to face their adversaries with 5th generation fighters (Israel and the USA), Iran need missiles rather than similar fighters which are impossible to be developed under their economic and political constrains, so that they can wage asymmetric war on their adversaries.

This was a very clever project management. These missiles together with drones are now being deployed effectively by Iran in the ongoing 2026 Iran/Israel War. The missiles and drones make possible the Iranian asymmetric warfare.

THE EFFECTIVE ASYMMETRIC WARFARE ECONOMICS: THE KEY DETERMINANT OF 2026 IRAN/ISRAEL WAR

World War II was won by the Allied because the might of the American economy outlasted the war. The cold war was ended with the disintegration of Soviet Union because the economy of the Soviet Union and its allies in Eastern Europe was not able to outlast the war. It was the pressure of the economy that had determined the outcome of both wars.

The objective of asymmetric warfare waged by an inferior side against the superior side in weaponry is to make the superior side suffer the war economy that it is not able to be at war any longer under the economic pressure. To achieve this objective, the choice of weapons is vital. The weapons of choice must be low cost, robust and expendable, which can easily be realized if they lack or have very minimum human factors engineering and also lack expensive sophisticated technology. In waging this asymmetric warfare, the choice of weapons by Iran have been excellent.

As can be compared from what are being described in this paper, the prize gaps between the Iranian weapons of choice and the Israelis side weapon of choice are very wide to the level of impractical for the Israelis side to sustain. Iran won the "prize gap war".

The USD100million per battery Iron Dome was used to counter a swarm of USD50,000 per unit of *Shahed* drones. The cost of 1 battery of Iron Dome equals the cost of 2000 units of *Shahed* drones or 200 units of *Shahed* drones cost only 10% of the cost of a battery of Iron Dome. Of course 200 *Shahed* drones can easily overwhelm a battery of Iron Dome, which cost 90% more expensive.

A couple of USD4million per unit of Arrow missiles may be used to intercept a USD200,000 *Fatah-2* HGV (hypersonic glide vehicle) because due to the hypersonic speed and high maneuverability of the HGV, 2 Arrow missiles may be needed to intercept it. Therefore USD8million is needed to intercept a

USD200,000 Iranian HGV. The cost of interception is 40 times the cost of the missile to be intercepted.

The Iranian had shot or damaged at least a unit of F-35 which cost at least USD100million using a *Majid* AD-08 missile costing only USD100,000 or the Iranian had used an anti-aircraft missile to shoot an aircraft which is 1000 (1 thousand times) more expensive than the missile.

The American anti missile systems are much more expensive than the Isrealis systems. For example a battery of Patriot costing USD1billion is 10 times more expensive than a battery of Iron Dome (USD100million). Therefore the economic impact of the interception of Iranian missiles by American anti missile systems is much worst.

These are the reality of the economics of asymmetric warfare waged by Iran against the Israelis side. The effective asymmetric warfare economics is what maintain the Iranian standoff against the Israelis side as of today. It may as well determine the outcome of this war.

Iran have been suffering economically for decades due to economic sanctions since 1979 followed by almost a decade of war with Iraq. The Israelis side have also been suffering economically due to the standoff with Iran for decades, but suffer more today due to the asymmetric warfare with Iran. However, the war is still ongoing. Neither side is winning.

Iran have chosen missiles and drones over advanced fighters. By this choice, Iran have eliminated human factors engineering and costly sophisticated technology. The outcome of this choice is effective asymmetric warfare economics which has been significantly contributing to them.

The authors take the opportunity to propose to the United Nations to immediately declare that nuclear weapons must not be employed in this 2026 Iran/Israel War because the economic frustration suffered by both sides may promote the idea of using nuclear weapons for a quick and immediate end of the war since both sides may have access to nuclear weapons. UN is responsible to avoid this possible nuclear catastrophe to humanity.

LESSON LEARNED

1. Employ asymmetric warfare against enemy with superior weapons.
2. Generally a larger country with less sophisticated and less expensive weapons consisting of missiles and drones may defeat a smaller country with more expensive sophisticated weapons consisting of stealth fighters and advanced anti missile systems.
3. Never “fight fire with fire” when the “fire” deployed by the enemy is more terrible, but rather “fight fire with water”.
4. Use multiple waves of attack missiles and drones against multiple layer of defense missiles. The first waves of attack missiles and drones are to overwhelm the defense missiles, while the later waves of attack missiles are to hit the targets after the defense missiles have been overwhelmed.
5. War is very expensive. A war can be won if the enemy can be outlasted economically with asymmetric warfare.
6. Effective asymmetric warfare economics is a new strategy for economic driven and economic influenced warfare.
7. Developing and operating missiles are less expensive but more effective than developing or purchasing and operating very sophisticated fighters such as stealth fighters due to minimum human factors engineering and less sophisticated technology for the missiles.
8. Developing countries like Malaysia should spend less on purchasing sophisticated fighters, and instead should spend more on the project management, research and development of missiles.
9. A bridgehead can be turned into a liability when it is indefensible.
10. A small country like Singapore is totally indefensible against overwhelming attacks by missiles and drones.
11. Wake seeking may be useful to be explored as a technique to detect stealth fighters. Wake is the atmospheric turbulence at the rear of the stealth fighters when flying through the atmosphere.

NO ARTIFICIAL INTELLIGENCE APPS (AI) POLICY

The authors practice a policy not to use artificial intelligence apps (AI) in writing papers. No AI was used by them to write this paper.

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