

20 Japan's defence industry

From indigenisation to exploring internationalisation

Christopher W. Hughes

Introduction

Japan's policy-makers, in line with the first modernisation efforts of the Meiji Period (1868–1912) and famous maxim of 'rich nation, strong army', have long viewed an indigenous defence production capability as integral to grand strategy and a means to maintain national security autonomy.¹ Japan thereafter by the early twentieth century built itself into one of the great imperial powers and most advanced producers of warships and airframes. But Japan's catastrophic defeat in 1945, immediate post-war demilitarisation, and subsequent minimalist defensive stance, reinforced by a range of anti-militaristic principles, necessarily limited the type and quantity of military production—most strikingly through eschewing possession of capabilities that form 'war potential'. In turn, Japan's utilisation of defence production and arms transfers for security ends was limited by the self-imposed 1967 and 1976 bans on the export of arms and military technology.²

Nevertheless, even as Japan's defence production stance has been constrained in comparison to other major powers in the post-war era it has remained a central element of Japanese security and international strategy.³ Japanese policy-makers and industry have worked to build an indigenous defence production base (*kokusanka*), with distinctive organisational structures, and that has proved relatively effective for the past several decades in preserving the Japan Self Defence Forces' (JSDF) access to advanced military technology, the potential to step change into more ambitious weapons systems if necessary, and a degree of international leverage for Japan.

In more recent years, however, Japan's model of defence production has come under stress due to a combination of the changing domestic political economy, restructuring of the global defence industry, and pressures of the regional security environment. Japan's policy-makers and defence manufacturers have thus now sought to adapt their production model—retaining many features of the post-war system and domestic production whilst also beginning to embark on new international collaborations.

Japan's post-war security constraints and defence production model

Japan's total defeat in World War II and the ensuing economic devastation, loss of independence under the US-dominated Allied Occupation (1945–1951), and undergoing of the process of the disbandment of the Imperial Armed Forces and demilitarisation embodied in the acceptance of Article 9 of the so-called 'peace constitution' of 1946, imposed a series of particular—if perhaps unique for a major industrialised state and eventually major military power—constraints on Japan's security policy for the entire post-war period.

Anti-militaristic prohibitions and principles shaping defence production

Article 9 of the constitution in its first paragraph renounced war as a sovereign right and the use of force for settling international disputes, and in its second paragraph the maintenance of land, sea and air forces for accomplishing the aims of the first paragraph were prohibited, along with the non-recognition of the right of the belligerency of the state. Although the Occupation authorities originally envisaged Japan's absolute and permanent demilitarisation, and the main opposition Japan Socialist Party viewed Article 9 as prohibiting the maintenance of any armed forces, conservative politicians—eventually to emerge into the long-governing Liberal Democratic Party (LDP)—held to the interpretation that armed forces could be maintained for 'exclusively defence-oriented defence' purposes.

Consequently, as the Cold War took hold in East Asia, the US 'reverse course' meant that it encouraged Japan to function as a partner to contain communism and to reestablish its armed forces, the US-Japan security treaty was signed in 1951 under which Japan provided bases for the US for the defence of the Far East, and the JSDF was founded in 1954. But even as Japan gradually remilitarised in the post-war period, the legacy of wartime defeat and the influence of Article 9 continued to place strong constraints on its doctrines for the procurement and use of military capabilities.

Japan's constraints have included the interpretation since the early 1950s of Article 9 to allow only the exercise of the right of individual self-defence and prohibition on the exercise of the right of collective self-defence, meaning in essence that it could only defend itself and not come to the assistance of its US security treaty partner. Japan was not to reinterpret and lift this ban on the exercise of collective self-defence until 2015.⁴ In addition, a series of anti-militaristic principles were enunciated (Table 20.1), derived from the spirit of Article 9 but not constitutionally binding.

Japan has progressively eroded or abandoned these anti-militaristic principles during the course of the post-war era (Table 20.1). Japan has felt obliged to stretch and reinterpret constitutional constraints due to the need to respond to the evolving security environment in the East Asia region and

Table 20.1 Japan's anti-militaristic principles derived from the Constitution

Three non-nuclear principles

- Japan provides no strict definition of the criteria for this, but stresses that it will not acquire military capabilities above the minimum necessary or that can threaten other states
- This has included non-procurement of power projection capabilities such as aircraft carriers, long-range missiles and bomber aircraft.

Three non-nuclear principles

- Prime Minister Satō Eisaku introduced the three non-nuclear principles in 1967.
- Japan is not to produce, possess, or introduce nuclear weapons.
- Japan is to rely instead on the US nuclear umbrella, although it does not regard the possession of its own nuclear deterrent as necessarily unconstitutional if used for the purposes of self-defence.
- The first two principles were strengthened by Japan's entry into the Non-Proliferation (NPT) in 1976.

Peaceful use of space

- In May 1969, the Diet imposed a resolution stating that Japanese activities in space should be limited to peaceful purposes, interpreted as meaning 'non-military' activities.
- Japan's development of spy satellites and a BMD system since the 1990s has challenged this principle.
- Japan eventually overturned this principle with the Basic Space Law in 2008 allowing the 'defensive' use of space.

- Japan has indicated since 2018 that it is studying the conversion of *Izumo*-class helicopter carrying destroyers to deploy fixed-wing F-35B fighters and thus acquire 'defensive' aircraft carriers
- Japan in 2018 budgeted for the procurement of long-range cruise missiles

- The third principle has been breached by the introduction into or transit through Japanese ports of nuclear weapons on US naval vessels.
- Japanese policy-makers in the past have studied the possible procurement of nuclear weapons
- Japan now possesses many of the components of a 'recessed' nuclear deterrent, including solid-fuelled rockets as delivery vehicles, satellites, a QZSS system for GPS and targeting, and re-entry vehicles

Restrictions on the exports of arms and military technology

- In 1967, Prime Minister Satō Eisaku's administration first enunciated restrictions on arms exports to communist states, countries under UN sanctions, and parties to international disputes.
- In 1976, Prime Minister Miki Takeo's administration ordered restraint in the case of all states, and prohibited the export of weapon-related technology.
- Restrictions have largely held, even though Japan has exported certain dual-use technologies with civilian and military applications
- Prime Minister Nakasone Yasuhiro partially breached this principle by signing an Exchange of Technology Agreement Between Japan and the United States in November 1983.
- Prime Minister Noda Yoshiaki in December 2011 issued a 'Statement on Guidelines for Overseas Transfer of Defence Equipment', allowing Japan's overseas transfers of defence equipment to enable a more proactive contribution to international security, to improve the performance of defence equipment, and to strengthen the alliance with the US and with other security cooperation partners.
- Prime Minister Abe Shinzo in April 2014 instituted the new Three Principles of Defence Equipment Transfers, preventing export to states considered to impede international peace and security, such as those transgressing international treaties or under UN sanctions, but allowing export to states contributing to international peace or Japan's security such as the US, NATO countries, and those engaged in UN PKO, and that could prove the controls in place to prevent re-export to third countries.

One percent of GNP limit on defence expenditure

- In 1976, Prime Minister Miki established the principle that defence expenditure should be limited to 1% of GNP.
 - Prime Minister Nakasone Yasuhiro in effect breached this principle by pushing defence spending just above 1% in 1986.
 - Successive administrations have kept Japanese defence spending at around the 1% level.
 - Prime Minister Abe announced in the National Diet in March 2017 that his administration had no intention of suppressing defense expenditure below 1% of GDP and that in fact no such budgetary policy ceiling existed
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globally, and increased expectations from its US security partner for a Japanese international security contribution. During the second phase of the Cold War, Japan's prime concern was the expansion of the USSR's influence in East Asia, and in the post-Cold War period Japan has faced North Korea's nuclear and ballistic missile programmes and most significantly China's rise and military modernisation. The consequence was that the JSDF underwent a major quantitative and qualitative expansion in the early and mid-1980s focussed on the build-up of Ground Self Defence Force (GSDF) heavy tanks and artillery, Maritime Self Defence Force (MSDF) destroyers and anti-submarine warfare capabilities, and Air Self Defence Force (ASDF) interceptors to prevent a Soviet invasion of northern Japan and to provide a defensive shield for US power projection from Japan. Since the start of the new millennium, the JSDF has emphasised the shift to a 'joint dynamic defence force', with more mobile and technologically advanced capabilities, ballistic missile defences (BMD), and deployments southwards to respond to North Korean threats and China's maritime activities and incursions into Japan's outlying island territories in the East China Sea. Throughout these periods, Japan has gradually deepened the security relationship with the US, to the point that by 1980 it became referred to as the US-Japan 'alliance'; that by the early 2000s Japan was prepared to despatch the MSDF and ASDF in non-combat roles to the Indian Ocean and southern Iraq to support US operations; and that by the middle of this decade the National Diet passed extensive legislation to enable JSDF collective self-defence in support of the US in a variety of scenarios.⁵

Japan by the contemporary period has thus evolved gradually once again into a significant military power and become a key US ally, deploying highly advanced capabilities. Nonetheless, Japan's development of its post-war security policy and choice of military capabilities has involved a constant navigation between the tensions of constitutional and anti-militaristic constraints and emerging external security drivers. In turn, Japan's development of its defence production model has also been very much entwined within this context and has had to constantly adapt to internal and external constraints.

Japan's rebuilding of an indigenous defence production model in the Cold War period

In the immediate post-war period, and following the logic of demilitarisation, Japan's defence industry faced the genuine possibility of extinction. The Occupation authorities banned all defence production and began to break up the main private industrial conglomerates deemed responsible for encouraging pre-war militarism—including Mitsubishi Heavy Industries (MHI), Mitsubishi Electric Company (MELCO), Ishikawajima Harima Heavy Industries (IHI), Nakajima Aircraft (today Fuji Heavy Industries [FHI]), Kawasaki Heavy Industries (KHI), Hitachi, Sumitomo, Mitsui, and Nippon Kōgyō Sangyō (today Nissan)—into smaller companies, many retooling for civilian production such as automobiles and scooters.

However, the reverse course, outbreak of the Korean War, and US demand for military vehicles and spares, helped to revive Japanese defence production and reconstitute the industrial conglomerates, and more generally stimulate growth for the rest of the devastated economy. Moreover, Japan's policy-makers—the Japan Defence Agency (JDA, Ministry of Defense [JMOD] since 2007), Ministry of Economy and Industry (METI), Ministry of Foreign Affairs (MOFA), and Defense Production Committee (DPC) of the Japan Business Federation (Nippon Keidanren) as the umbrella organisation for a variety of defense producer associations and individual enterprises—never abandoned their belief in the importance of indigenous military technology to help preserve national autonomy and thus have sought to rebuild the defense industrial base.

Japan's policy-makers and industrial actors have articulated a series of objectives for building the defence production base. First, Japan should develop a defense production system capable of maintaining JSDF national deterrent capabilities. Military technology should meet Japan's 'unique' defensive needs, and especially its policy of 'exclusively defense-oriented defense' and geographical particularities of long coast lines and deep surrounding sea space. Second, Japan's defense production should provide a technological base to augment negotiating leverage in the broader international community, but especially technology to bring into the context of alliance cooperation with the US. Third, Japan should ensure self-sufficiency and stable supplies of defense equipment and retain the necessary highly-skilled workers in a market environment of relatively low order numbers to the sole customer of the JSDF, whilst at the same time being able to ramp up production in a time of national emergency. METI and the DPC, in particular, have promoted Japan's limited in scale but technologically advanced defense production base as part of industrial policy and as a means to generate 'dual-use' technology for the civilian sector.

Japan's policy-makers and industrialists have maintained a rough consensus that an indigenous production base would not be redeveloped through a strategy of autarky and large-scale defence spending; this was simply not practical given the initial post-war state of the Japanese economy and history of interconnection with militarism. Instead, Japan would keep defence expenditure to a minimum, and nurture indigenous production in part through the government's direct and indirect subsidisation of the defense industry, but more importantly through embedding it in the larger civilian-oriented sector, and subordinating defence production to the government's civilian developmental priorities. Japan's civilian sector would draw technological 'spin-off' from the military sector, and where necessary the smaller military sector would derive 'spin-on' technology from the civilian sector. In Japan, there was to be nothing akin to the so-called 'military-industrial complex' characterised by large-scale and predominantly defence-oriented corporations with close ties to the military establishment.

Japan would pursue a degree of international cooperation with the US in order to provide foreign military sales (FMS) to provide relatively fast, low-cost, and low-risk technology for the JSDF's immediate needs, and licensed production for

learning and innovating upon already tested defence technology to help rebuild indigenous technological capabilities, and to then enable greater national autonomy over the longer term. But Japan's policy-makers have always been wary that reliance on the US for FMS and licensed production may mean restrictions on being able to access and produce the very latest foreign weapons systems, and that the opportunities for learning technologically are necessarily limited. Instead, Japan's traditional preference has been for pure indigenous production and autonomous technology, offering as it does the maximum contribution to the defence production base and maintaining of employment, even if also presenting high technological development risks and high procurement costs.

Japan's defence production structure: budgets, scale, participants

Defence expenditure trends and industry scale

As Japan's 'economic miracle' and period of rapid growth took hold from the 1960s to 1980s, and as JSDF obligations and capabilities increased significantly in the 1980s, so the national defence budget rose steeply. By the mid-2000s, Japan's defence expenditure in nominal dollar terms reached US\$40-\$45 billion, and received international attention as it ranked amongst the top five globally. The relative size of Japan's defence expenditure was inflated, though, by the strength at that time of the yen against the US dollar. If Japan's defence budget is calculated throughout in nominal yen it can be seen to have stagnated and actually fallen from the late 1990s, with around US\$40 billion or ¥5 trillion accepted as a practical accepted ceiling on expenditure (**Table 20.2, Figure 20.1**).

Japan's defence budget did not experience the large scale growth of the US in the post-9/11 period or of a rising China since the 1990s. The Japanese economic downturn since the early 1990s and heavy government pump-priming expenditure and debt (government gross public debt reaching 200 percent of GDP by 2013; the highest in the industrialised world) has constrained the room for the expansion of defence spending. Japan's government has generally kept defence budget increases at less than 1 percent annually and generally maintained its 1 percent of GNP limit on defence expenditure (Table 20.2). Defence expenditure as a proportion of annual government expenditure has remained constant at around 5 to 6 percent (Table 20.2). Significantly for defence production, the proportion of the defence budget available for equipment procurement has fallen from around 28 percent in 1988 to around 17 percent by 2018, with increasing proportions of the budget earmarked instead for personnel costs and pensions (Table 20.3, Figure 20.2). Research and development (R&D) allocations have fluctuated at around 2 to 3 percent of the defence budget in this period (Table 20.4). Furthermore, defence expenditure has declined relatively as a government priority, staying steady at around 5 percent, in comparison to the increasing proportion of expenditure, at around 40 percent devoted to social security and public works in the last decade.⁶ Japan only began to reverse these trends with the ascension to power of Prime Minister Abe Shinzō in 2012 and his administration's implementing of annual

Table 20.2 Japan's defence expenditure in nominal yen, as percentage of GNP, and percentage of total government expenditure, 1975–2018

	<i>Expenditure (¥100 million)</i>	<i>Percentage of GNP</i>	<i>Percentage of total government expenditure</i>
1975	13,273	0.84	6.23
1976	15,124	0.90	6.22
1977	16,906	0.88	5.93
1978	19,010	0.90	5.54
1979	20,945	0.90	5.43
1980	22,302	0.90	5.24
1981	24,000	0.91	5.24
1982	25,861	0.93	5.21
1983	27,542	0.98	5.47
1984	29,346	0.99	5.80
1985	31,371	1.00	5.98
1986	33,435	0.93	6.18
1987	35,174	1.00	6.50
1988	37,003	1.01	6.53
1989	39,198	1.01	6.49
1990	41,593	1.00	6.28
1991	43,860	0.95	6.23
1992	45,518	0.94	6.30
1993	46,406	0.94	6.41
1994	46,835	0.96	6.41
1995	47,236	0.96	6.65
1996	48,455	0.98	6.45
1997	49,414	0.96	6.39
1998	49,420	0.95	6.35
1999	49,201	0.99	6.01
2000	49,218	0.99	5.79
2001	49,388	0.95	5.98
2002	49,395	1.00	6.08
2003	49,265	0.99	6.02
2004	48,764	0.98	5.94
2005	48,301	0.94	5.88
2006	47,906	0.93	6.01
2007	47,818	0.92	5.80
2008	47,426	0.90	5.71
2009	47,028	0.92	5.30
2010	46,826	0.96	5.10
2011	46,625	0.96	5.00

(Continued)

Table 20.2 (Cont.)

	<i>Expenditure (¥100 million)</i>	<i>Percentage of GNP</i>	<i>Percentage of total government expenditure</i>
2012	46,453	0.97	5.10
2013	46,804	0.96	5.05
2014	47,838	0.96	4.99
2015	48,221	0.96	5.01
2016	48,607	0.94	5.03
2017	48,996	0.86	5.03
2018	49,338	0.87	5.05

Source: Asagumo Shimbunsha, *Bōei Handobukku*, various years

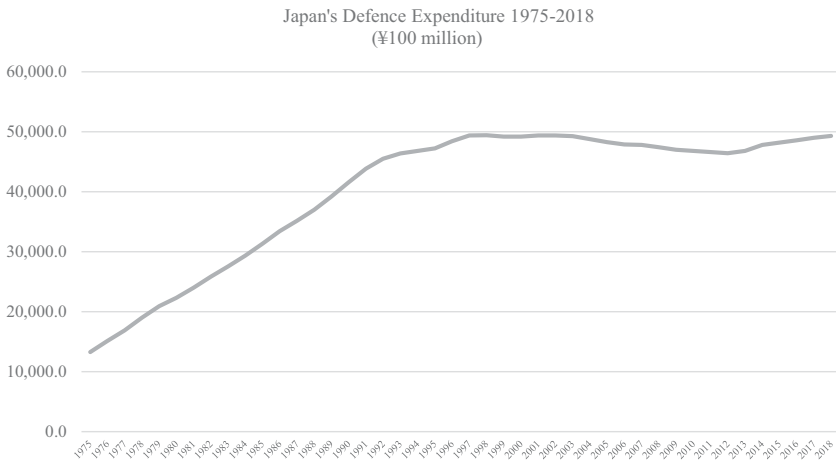


Figure 20.1 Japan's defence expenditure 1975–2018 (¥100 million)

defence increases between 1 and 2 percent from 2013 to 2018. Indeed, the JMOD under the Abe administration in 2018 placed a request for a 2.1 increase to the defence budget for 2019/2020 to create Japan's largest defence budget in the post-war period.⁷

Japan's defense industry in relation to overall national economic size is highly moderate in scale, accounting since the 1980s for less than 1 percent of total industrial production.⁸ Additionally, defense production since the early 1980s can be seen to account for only a small proportion of total national production in a number of key industrial sectors; for instance, registering less than 1 percent in electronics communications and vehicles. Ammunition and aircraft

(although even military aircraft production has declined as a proportion of national production from over 80 percent in the 1980s to around 30 percent in 2015), and to some extent shipbuilding, are exceptions with much higher percentages (Figure 20.3).

Table 20.3 Defence equipment procurement as a percentage of overall Japanese defence expenditure (%)

1988	28.1
1989	28.0
1990	27.4
1991	27.7
1992	25.1
1993	23.3
1994	21.3
1995	18.4
1996	18.9
1997	18.9
1998	19.2
1999	19.6
2000	18.6
2001	18.6
2002	18.6
2003	18.3
2004	18.1
2005	18.6
2006	17.9
2007	18.1
2008	17.1
2009	17.5
2010	16.5
2011	16.7
2012	16.3
2013	15.9
2014	16.6
2015	15.4
2016	15.8
2017	17.2
2018	16.6

Source: Asagumo Shimbunsha, *Bōei Handobukku*, various years

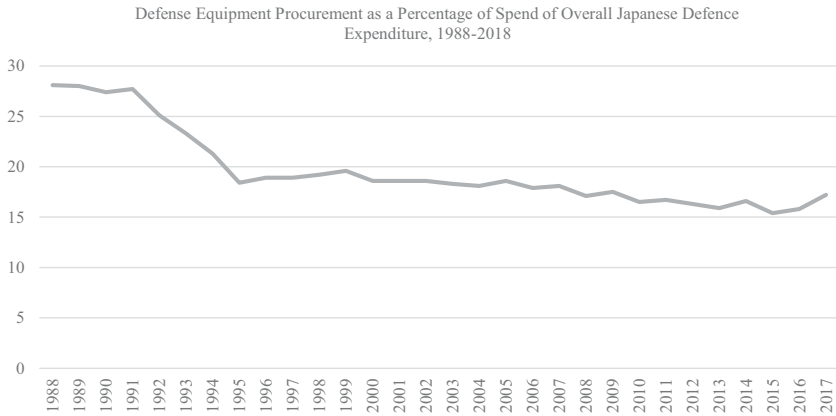


Figure 20.2 Defence equipment procurement as a percentage of overall Japanese defence expenditure, 1988–2017

Table 20.4 Japan's defence R&D budget, 1988–2018 (Unit: ¥100 million; %)

Year	Defence budget	R&D budget	% increase over previous year	R&D ratio to defence budget
1988	37,003	733	–	2.0
1989	39,198	828	12.96	2.1
1990	41,593	929	12.20	2.2
1991	43,860	1,029	10.76	2.3
1992	45,518	1,148	11.56	2.5
1993	46,406	1,238	7.84	2.7
1994	46,835	1,255	1.37	2.7
1995	47,236	1,401	11.63	3.0
1996	48,455	1,496	6.78	3.1
1997	49,414	1,605	7.29	3.2
1998	49,290	1,277	-20.44	2.6
1999	49,201	1,307	2.35	2.7
2000	49,218	1,205	-7.80	2.4
2001	49,388	1,353	12.28	2.7
2002	49,395	1,277	-5.62	2.6
2003	49,265	1,470	15.11	3.0
2004	48,764	1,707	16.12	3.5
2005	48,301	1,316	-22.91	2.7
2006	47,906	1,714	30.24	3.6

(Continued)

Table 20.4 (Cont.)

Year	Defence budget	R&D budget	% increase over previous year	R&D ratio to defence budget
2007	47,818	1,445	-15.69	3.0
2008	47,426	1,728	19.6	3.6
2009	47,028	1,198	30.7	2.5
2010	46,826	1,588	32.6	3.4
2011	46,625	851	46.4	1.8
2012	46,453	944	10.9	2.0
2013	46,804	1,541	63.3	3.3
2014	47,838	1,477	-4.2	3.1
2015	48,221	1,411	-4.5	2.9
2016	48,607	1,055	-25.3	2.2
2017	48,996	1,217	15.4	2.5
2018	49,388	1,034	-15.0	2.1

Source: *Bōei Hakusho* 2006; *Bōei Handobukku* 1997, 1998, 2007, 2017.

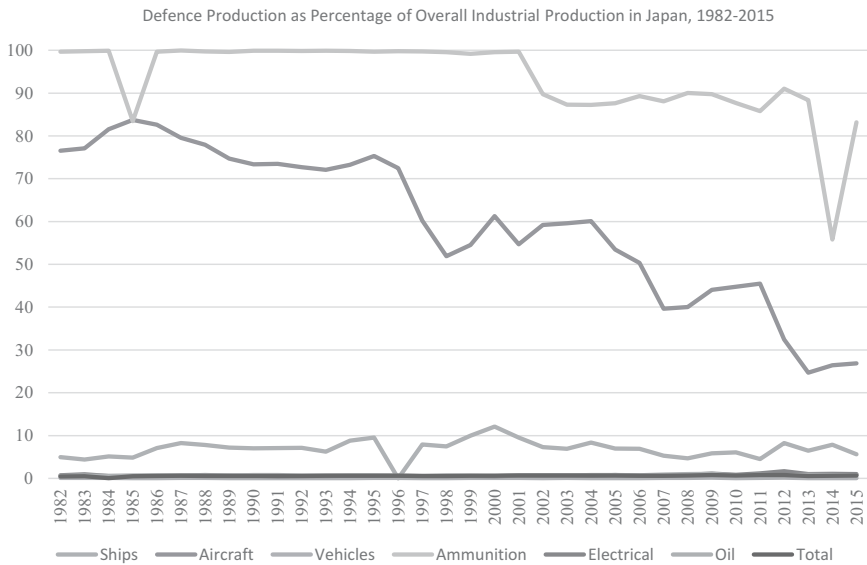


Figure 20.3 Defence production sectors as a percentage of overall industrial production in Japan, 1982–2015

Defence contractors

In accordance with Japan's techno-nationalist strategy, defense production has been concentrated within a relatively small number of conglomerates largely focused on civilian production. MHI has remained the leading defense contractor over the last two decades (only once losing its top spot to KHI in 2015) in terms of sales and numbers of contracts, and generally securing up to 25 percent of all contracts.⁹ (Table 20.5) The top 20 contracts have been dominated by the 'heavies' of KHI, FHI, Sumitomo Heavy Industries (SHI), Toshiba, IHI, MELCO, NEC and Komatsu, and with trading companies such as Itōchū and Sumitomo involved in the importation of defense equipment. These enterprises operate a near oligopoly in Japanese defense procurement with over 75 percent of total contracts, but defense tends to be a small share of their overall business. MHI, despite taking nearly a quarter of defense contracts, typically derives only around 10 percent of its total sales from this sector. The story is similar for KHI, and for others the share is less still at below 4 percent. Globally, Japanese defense contractors are also relatively small in scale, with MHI, from a high of 11th in the list of the world's largest defence contractors by sales in 2000, declining to 43rd by 2018.¹⁰

However, outside the top 20 defense contractors there exists a range of small and medium enterprise (SME) primary and second subcontractors more heavily vested in defense production. The DPC and JMOD have calculated that the production of a Maritime Self Defense Force (MSDF) destroyer requires up to 72 direct contractors, 1,378 primary subcontractors and 1,073 secondary subcontractors; a Ground Self Defense Force (GSDF) Type-90 main battle tank (MBT) 52 direct contractors, 842 primary subcontractors and 568 secondary contractors; an Air Self Defense Force (ASDF) F-15J 13 direct contractors, 530 primary subcontractors and 593 secondary subcontractors; and an ASDF *Patriot* SAM four direct contractors, 125 primary subcontractors, and 1,093 secondary contractors.¹¹ The Shipbuilders' Association of Japan (SAJ) has estimated that over 80 percent of the work for destroyers, submarines and minesweepers is carried out by SMEs.¹² SMEs are in part engaged in metal-bashing and component manufacture, but many possess highly-skilled specialist manufacturing capabilities for certain technologies. For instance, SMEs produce many of the key components of the Standard Missile (SM)-3 missile upgrades jointly developed between Japan and the US.¹³ Many of these SMEs, in contrast to the top 20 contractors, are highly dependent on defense. For whereas the overall level of dependency on defense of all companies that have some engagement in this sector is approximately 4 percent, there are a considerable number of companies with an annual total turnover of less than ¥500 million (approximately US\$5million) which are between 50–90 percent dependent on the defense business.¹⁴

Table 20.5 Japan's top 20 defence production companies, 1997–2016 (Unit: ¥100 million)

Position	1997					1998					1999				
	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	
1	MHI	235	2,719	20.6	1	MHI	222	3,234	26.7	1	MHI	208	2,797	22.1	
2	KHI	117	1,468	11.1	2	MELCO	188	1,030	8.3	2	KHI	97	1,322	10.5	
3	MELCO	197	1,287	9.7	3	KHI	93	872	7.0	3	MELCO	200	1,121	8.9	
4	NEC	306	746	5.6	4	IHI	78	644	5.2	4	Toshiba	116	538	4.3	
5	IHI	82	662	5.0	5	NEC	207	446	3.6	5	IHI	72	535	4.2	
6	Toshiba	130	486	3.7	6	Toshiba	127	377	3.0	6	NEC	293	426	3.4	
7	Marine United	4	377	2.9	7	Komatsu	47	353	2.8	7	Komatsu	44	371	2.9	
8	Komatsu	44	344	2.6	8	Mitsui Zosen	6	277	2.2	8	Hitachi	37	344	2.7	
9	Nissan Motors	60	253	1.9	9	Nissan Motors	63	267	2.2	9	Nissan Motors	61	273	2.2	
10	NEC Business Machines	220	252	1.9	10	Marine United	1	267	2.1	10	NEC Business Machines	233	255	2.0	
11	Hitachi Daikin Industries	70	238	1.8	11	NEC Business Machines	231	262	2.1	11	Marine United	1	247	2.0	
12	FHI	67	179	1.4	12	Hitachi Mitsubishi Corporation	53	219	1.8	12	Hitachi	55	218	1.7	
13		49	171	1.3	13		19	157	1.3	13	Fujitsu	129	166	1.3	

(Continued)

Table 20.5 (Cont.)

		1997					1998					1999				
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements		
14	Oki Electric Industry	62	164	1.2	14	Oki Electric Industry	68	150	1.2	14	Yamada Corporation	39	160	1.3		
15	Itochu Aviation	48	157	1.2	15	Daikin Industries	49	148	1.2	15	Daikin Industries	53	134	1.1		
16	Shimaywa Industries	9	148	1.1	16	Fujitsu Itochu Aviation	115	147	1.2	16	JSW	21	127	1.0		
17	Kanematsu	12	130	1.0	17	FHI	23	136	1.1	17	Itochu Aviation	32	120	1.0		
18	NKK Steel	19	114	0.9	18	FHI	35	133	1.1	18	FHI	25	112	0.9		
19	Fujitsu Isuzu Motors	137	112	0.8	19	JSW	16	130	1.0	19	Shimaywa Industries	8	107	0.8		
20	Motors	62	100	0.8	20	Kanematsu	5	111	0.9	20	Oki Electric Industry	64	104	0.8		
Total		1,930	10,106	76.6		Total	1,646	9,457	76.1		Total	1,788	9	75		

2000		2001				2002								
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements
1	MHI	222	3,074	24.4	1	MHI	226	2,755	21.7	1	MHI	205	3,481	27.2
2	MELCO	205	1,208	9.6	2	KHI	114	1,213	9.6	2	KHI	102	1,102	8.6
3	KHI	112	987	7.8	3	MELCO	185	1,010	8	3	MELCO	178	735	5.7
4	IHI	72	540	4.3	4	NEC	328	577	4.5	4	IHI	48	527	4.1
5	NEC	336	465	3.7	5	IHI	45	545	4.3	5	Toshiba	123	498	3.9
6	Toshiba	128	430	3.4	6	Toshiba	126	452	3.6	6	NEC	312	485	3.8
7	Mitsui					Hitachi				7	Komatsu	43	357	2.8
8	Zosen	5	363	2.9	7	Zosen	33	398	3.1	8	Itochu	5	232	1.8
9	Komatsu	47	354	2.8	8	Komatsu	55	372	2.9	9	Shimaywa Industries	13	229	1.8
10	Shimaywa Industries	11	323	2.6	9	IHI				10	Fujitsu	166	223	1.7
11	NEC Business				10	Aerospace	53	273	2.2	11	FHI	38	216	1.7
12	Machines	234	277	2.2	11	NEC Business				12	MELCO	164	187	1.5
13	IHI	46	261	2.1	12	Machines	179	256	2	13	Daikin Industries	57	179	1.4
14	Aerospace	42	149	1.2	13	Hitachi	78	251	2	14	IHI	42	159	1.2
15	FHI	42	149	1.2	14	Shimaywa Industries	10	250	2	15	Nippon Kokan	22	143	1.1
16	Daikin Industries	53	146	1.2	15	Marine United	2	250	2	16	Hitachi	69	142	1.1
	Fujitsu	143	146	1.2	16	FHI	28	180	1.4					

(Continued)

2003

2004

2005

	2003			2004			2005							
	Position	Amount	Percentage of	Position	Amount	Percentage of	Position	Amount	Percentage of					
	Company	No. of	annual pro-	Company	No. of	annual pro-	Company	No. of	annual pro-					
		contracts	UREMENTS		contracts	UREMENTS		contracts	UREMENTS					
1	MHI	213	2,817	22.1	1	MHI	164	2,706	20.7	1	MHI	192	2,417	17.6
2	KHI	97	1,588	12.5	2	KHI	97	1,429	10.9	2	KHI	83	1,297	9.4
3	MELCO	170	949	7.5	3	MELCO	169	1,032	7.9	3	MELCO	165	1,142	8.3
4	NEC	306	563	4.4	4	NEC	270	906	6.9	4	NEC	314	10,078	7.8
5	Toshiba	107	389	3.1	5	IHI	40	493	3.8	5	Toshiba	96	495	3.6
6	Komatsu	56	376	2.9	6	IHI Marine United	5	480	3.7	6	Universal Shipbuilding Corporation	27	397	2.9
7	IHI	39	361	2.8	7	Toshiba	74	415	3.2	7	Kawasaki Zosen	5	353	2.6
8	FHI	35	288	2.3	8	Komatsu	50	347	2.7	8	IHI	47	348	2.5
9	Kawasaki Zosen	4	257	2	9	FHI	36	240	1.8	9	Komatsu	45	338	2.5
10	Itochu	3	219	1.7	10	Itochu	2	228	1.7	10	Fujitsu	185	313	2.3
11	Fujitsu	164	210	12.6	11	Fujitsu	161	218	1.7	11	FHI	41	291	2.1
12	Hitachi IHI	78	210	1.6	12	IHI Aerospace	35	157	1.2	12	Itochu	7	274	2.0
13	Aerospace	38	169	1.3	13	Hitachi	76	145	1.1	13	Hitachi	88	210	1.5
14	Nippon Kokan	22	151	1.2	14	Nakagawa Bussan Daikin	135	142	1.1	14	Nakagawa Bussan	174	207	1.5
15	Industries	60	142	1.1	15	Industries	53	136	1.0	15	Nippon Oil	88	127	0.9
16		131	130	1	16		25	111	0.9	16		52	122	0.9

(Continued)

(Cont.)

		2003				2004				2005				
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements
	NEC Business Machines					Universal Shipbuilding Corporation					Daikin Industries			
17	Mitsubishi Corporation	16	88	0.7	17	Nippon Oil	94	107	0.8	17	Cosmo Oil	103	121	0.9
18	Isuzu Motors	58	86	0.7	18	JSW NEC Business Machines	18	104	0.8	18	MCC	2	116	0.8
19	Ok Electric Industry	43	84	0.7	19	Sumitomo Trading	42	77	0.6	19	Shimaywa Industries IHI	11	105	0.8
20	Sumitomo Trading	42	77	0.6	20	Cosmo Oil	118	94	0.7	20	Aerospace	39	103	0.7
	Total	1,682	9,155	71.9		Total	1,706	9,590	73.4		Total	1,764	9,854	71.6

2006

2007

2008

	2006	2007	2008											
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements
1	MHI	190	2,776	21	1	MHI	174	3,275	25.1	1	MHI	198	3,140	22.7
2	KHI	103	1,306	9.9	2	MELCO	162	961	7.4	2	MELCO	178	1,556	11.3
3	MELCO	166	1,177	8.9	3	NEC	287	717	5.5	3	KHI	96	1,530	11.1
4	NEC	304	831	6.3	4	KHI	93	668	5.1	4	NEC	306	982	7.1
	IHI													
	Marine													
5	United	1.0	446	3.4	5	Toshiba	78	570	4.4	5	Fujitsu	165	443	3.2
6	Fujitsu	185	441	3.3	6	Fujitsu	172	442	3.4	6	IHI	37	383	2.8
7	Toshiba	79	423	3.2	7	FHI	49	374	2.9	7	Komatsu	44	365	2.6
8	IHI	48	365	2.8	8	Komatsu	40	334	2.6	8	Toshiba	93	315	2.3
9	Komatsu	40	363	2.7	9	IHI	31	320	2.5	9	Nakagawa Bussan	316	216	1.6
10	FHI	34	199	1.5	10	Kawasaki Shipbuilding Corporation	6	314	2.4	10	Nippon Oil	114	193	1.4
11	Hitachi	78	194	1.5	11	Nakagawa Bussan	190	216	1.7	11	Hitachi	75	182	1.3
12	Nakagawa Bussan	210	148	1.1	12	Hitachi	69	198	1.5	12	Cosmo Oil	105	164	1.2
13	Nippon Oil	106	143	1.1	13	Nippon Oil	101	162	1.2	13	Daikin Industries	54	144	1.0
14	Daikin Industries	62	133	1.0	14	Cosmo Oil	101	148	1.1	14	Itochu Aviation	135	138	1.0
15	Industries	95	131	1.0	15	JSW	18	139	1.1	15	FHI	35	137	1.0

(Continued)

2009						2010						2011					
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements			
1	MHI	212	2,629	20.8	1	MHI	215	2,600	22.2	1	MHI	233	2,888	19.6			
2	MELCO	150	1,827	14.5	2	MELCO	159	1,016	8.7	2	KHI	140	2,099	14.3			
3	KHI	102	1,043	8.3	3	KHI	106	892	7.6	3	MELCO	121	1,153	7.8			
4	NEC	287	722	5.7	4	NEC	271	863	7.4	4	NEC	301	1,151	7.8			
5	Fujitsu	158	495	3.9	5	IHI Marine United	2	785	6.7	5	Fujitsu	169	529	3.6			
6	Komatsu	45	343	2.7	6	Fujitsu	137	431	3.7	6	Toshiba	73	504	3.4			
7		2	297	2.4	7	Komatsu	40	334	2.8	7	IHI	37	354	2.4			
8	Hitachi	85	197	1.6	8	Kawasaki Shipbuilding Corporation	1	310	2.6	8	Komatsu	58	334	2.3			
9	Toshiba	66	168	1.3	9	IHI	39	280	2.4	9	JX Energy	143	272	1.8			
10	Mitsui Zosen	17	164	1.3	10	JX Energy	129	191	1.6	10	Hitachi	88	255	1.7			
11	Nakagawa Bussan	194	150	1.2	11	Toshiba	63	183	1.6	11	Cosmo Oil	158	178	1.2			
12	JSW	16	147	1.2	12	Hitachi	82	181	1.5	12	Daikin Industries	37	158	1.1			
13	Nippon Oil	95	146	1.2	13	Cosmo Oil	95	165	1.4	13	Nakagawa Bussan	180	151	1.0			
14	IHI	32	144	1.1	14	Daikin Industries	40	140	1.2	14	Sumitomo Corporation	20	147	1.0			

(Continued)

(Cont.)

		2010				2011			
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements
15	Cosmo Oil	85	140	1.1	15	JSW	18	129	1.1
16	Daikin Industries	46	134	1.1	16	IHI Aerospace	25	102	0.9
17	Isuzu Motors	77	123	1.0	17	Nakagawa Bussan	177	100	0.9
18	Ok Electric Industry	47	119	0.9	18	FHI	25	96	0.8
19	IHI Aerospace	27	119	0.9	19	Kamei	239	93	0.8
20	FHI	27	105	0.8	20	Ok Electric Industry	47	91	0.8
	Total	1,770	9,212	73.0		Total	1,910	8,982	76.7
						Ok Electric Industry	49	140	1.0
						Showa Shell Isuzu Motors	99	130	0.9
						FHI	34	122	0.8
						Sumitomo Corporation	151	111	0.8
						Hanwa Kogyo	141	100	0.7
						Total	2,305	10,901	74.0

2012

2013

2014

	2012			2013			2014							
Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements
1	MHI	225	2,403	15.7	1	MHI	195	3,165	24.9	1	MHI	213	2,632	16.7
2	NEC	246	1,632	10.7	2	MELCO	124	1,040	8.2	2	KHI	156	1,913	12.2
3	KHI	120	1,480	9.7	3	KHI	128	948	7.5	3	NEC	287	1,013	6.4
4	MELCO	115	1,240	8.1	4	NEC	256	799	6.3	4	ANA Holdings	1	928	5.9
5	DSN	2	1,221	8.0	5	IHI	31	483	3.8	5	MELCO	118	862	5.5
	Japan Marine													
6	United	3	740	4.8	6	Fujitsu	114	401	3.2	6	IHI	20	619	3.9
7	Toshiba	73	503	3.3	7	Komatsu	27	294	2.3	7	Fujitsu	128	527	3.4
8	Fujitsu	111	300	2.0	8	Toshiba	54	284	2.3	8	Toshiba	70	467	3.0
9	IHI	31	277	1.8	9	JX Energy	153	271	2.1	9	Komatsu	34	339	2.2
10	Komatsu	31	267	1.7	10	Hitachi	64	242	1.9	10	Mitsubi Zosen	8	319	2.0
11	JX Energy	129	244	1.6	11	Cosmo Oil	119	188	1.5	11	Irochu Aviation	37	287	1.8
12	Hitachi Cosmo	64	219	1.6	12	Daikin Industries	33	149	1.2	12	JX Energy	140	261	1.7
13	Oil	125	177	1.2	13	Showa Shell	107	146	1.2	13	Hitachi	63	219	1.4
14		39	145	0.9	14		44	135	1.1	14		113	207	1.3

(Continued)

2015

2016

Position	Company	No. of contracts	Amount	Percentage of annual procurements	Position	Company	No. of contracts	Amount	Percentage of annual procurements
1	KHI	118	2,778	15.3	1	MHI	217	4,532	24.6
2	MHI	178	1,998	11.0	2	KHI	116	994	5.4
3	IHJ	37	1,147	6.3	3	NEC	261	905	4.9
4	MELCO	94	1,083	6.0	4	Fujitsu	138	783	4.3
5	NEC	233	739	4.1	5	MELCO	119	767	4.2
6	Toshiba	63	573	3.2	6	Japan Marine United	2	410	2.2
7	Japan Marine United	3	389	2.1	7	IHI	35	355	1.9
8	Fujitsu	98	364	2.0	8	Toshiba	35	288	2.3
9	Komatsu	29	291	1.6	9	Komatsu	30	317	1.7
10	Sumitomo Shoji	15	261	1.4	10	FHI	3	219	1.7
11	Kosoku Marine Transport	1	250	1.4	11	Oki Electric Industry	51	348	1.1
12	JX Energy	134	184	1.0	12	Nippon Kokan	28	176	1.0
13	Daikin Industries	35	156	0.9	13	Hitachi	51	157	0.9
14	JSW	17	152	0.8	14	Cosmo Oil Marketing	163	149	0.8
15	GS Yuasa Technology	19	145	0.8	15	Daikin Industries	34	130	0.7
16	Hitachi	64	143	0.8	16	JSW	19	128	0.7
17	Cosmo Oil	60	126	0.7	17	Sumi-Sho Aerosystems Corporation	46	119	0.6
18	Shinmaywa Industries	8	123	0.7	18	Shinmaywa Industries	7	114	0.6
19	Nakagawa Bussan	80	121	0.7	19	JX Energy	97	113	0.6
20	Fujitsu	25	116	0.6	20	Sumitomo Trading	3	110	0.6
	T total	1,311	11,138	61.4		Total	1,400	11,004	59.8

Source: *Bōei Nankam*, various years.

Table 20.6 Method of procurement contracts, 1993–2016 (Unit: ¥100 million; number in parentheses are percentages)

<i>Financial Year</i>	<i>Amount</i>	<i>Competitive bidding</i>	<i>Limited competition</i>	<i>Non-competitive awards</i>	<i>Total</i>
1993	No. contracts	957 (9.85)	4,954 (51.00)	3803 (39.15)	9,714
	Monetary value	95 (0.69)	1,899 (13.84)	11,724 (85.46)	13,718
1994	No. contracts	1,287 (12.38)	5205 (50.06)	3905 (37.56)	10,397
	Monetary value	138 (1.02)	1,759 (12.99)	11,640 (85.99)	13,536
1995	No. contracts	1,581 (14.56)	5,248 (48.32)	4,032 (37.12)	10,861
	Monetary value	209 (1.57)	2,004 (15.00)	11,141 (83.43)	13,353
1996	No. contracts	2,058 (19.98)	4,645 (45.10)	3,595 (34.90)	10,298
	Monetary value	356 (2.62)	1,588 (11.72)	11,611 (85.66)	13,555
1997	No. contracts	2,771 (28.04)	3,659 (37.03)	3,450 (34.92)	9,880
	Monetary value	493 (3.73)	1,430 (10.83)	11,277 (85.43)	13,200
1998	No. contracts	3,247 (33.80)	3,223 (34.50)	3,046 (31.70)	9,616
	Monetary value	565 (4.60)	1,146 (9.20)	10,720 (86.20)	12,431
1999	No. contracts	5,297 (51.74)	2,124 (20.75)	2,817 (27.52)	10,238
	Monetary value	953 (7.54)	1,580 (12.50)	10,106 (79.97)	12,639
2000	No. contracts	5,872 (60.77)	912 (9.44)	2,879 (29.86)	9,663
	Monetary value	1,063 (8.44)	1,604 (12.74)	9,928 (78.82)	12,595
2001	No. contracts	6,021 (61.43)	847 (8.64)	2,934 (29.93)	9802
	Monetary value	1,000 (7.88)	1,495 (11.78)	10,192 (80.33)	12,687
2002	No. contracts	5,432 (61.12)	674 (7.58)	2,782 (31.30)	8,888
	Monetary value	973 (7.61)	1,324 (10.35)	10,495 (82.04)	12,792
2003	No. contracts	5,045 (59.22)	681 (7.99)	2,793 (3.28)	8,519
	Monetary value	893 (7.01)	770 (6.05)	11,069 (86.94)	12,732
2004	No. contracts	4,586 (56.30)	678 (8.30)	2,878 (35.30)	8,142
	Monetary value	840 (6.40)	1,242 (9.50)	10,979 (84.10)	13,062
2005	No. contracts	4,839 (56.0)	676 (7.8)	3,127 (36.1)	8642
	Monetary value	1,099 (8.0)	901 (6.6)	11,738 (85.4)	13,738

(Continued)

Table 20.6 (Cont.)

<i>Financial Year</i>	<i>Amount</i>	<i>Competitive bidding</i>	<i>Limited competition</i>	<i>Non-competitive awards</i>	<i>Total</i>
2006	No. contracts	6,555 (76.2)	260 (3.0)	1,791 (20.8)	8,606
	Monetary value	3,356 (26.7)	279 (2.1)	9,411 (71.2)	13,226
2007	No. contracts	5,961 (77.2)	177(2.3)	1,583 (20.5)	7,721
	Monetary value	3,698 (28.4)	252 (1.9)	9,085 (69.7)	13,034
2008	No. contracts	6,565 (83.3)	38 (0.5)	1,282 (16.3)	7,885
	Monetary value	5,021 (36.3)	390 (2.8)	8,409 (60.8)	13,820
2009	No. contracts	6,845	17 (17)	873	7,903
	Monetary value	5,957	661	5,434	12,627
2010	No. contracts	5,928	4	795	6,875
	Monetary value	4,652		836	8,704
2011	No. contracts	7,698		836	8,704
	Monetary value	6,915		7,254	14,716
2012	No. contracts	5,906		767	6,833
	Monetary value	6,750		7,205	15,287
2013	No. contracts	5,869	5	828	6,901
	Monetary value	5,005	331	6,288	12,693
2014	No. contracts	5,726	2	994	6,925
	Monetary value	5,284	289	8,338	15,717
2015	No. contracts	5,486	10	930	6,693
	Monetary value	4,992	395	8,333	18,126
2016	No. contracts	5,643	9	919	6,767
	Monetary value	4,549	426	8,628 (46.9)	18,397

Source: *Bōei Nenkan*, various years

Market operation and incentives

For many Japanese corporations, therefore, defence contracting functions are something of a sideline compared to more substantial and profitable civilian operations. Moreover, Japanese corporations have been cautious about levels of participation in the defence market for reputational reasons, given the

legacy of the image of corporations' involvement in pre-war militarism, and concerns about the Japanese public's antimilitarism perception of defence contractors as 'merchants of death'.¹⁵

Nevertheless, Japanese corporations have engaged in defense for a number of reasons. Firstly, the government has been prepared to nurture and protect the industry. JMOD has offered an increasing number of competitive procurement bids since the early 1990s, but the actual monetary value percentage of competitive bids was below 10 percent for much of this period, although began to rise to the 50 percent level by 2018 (Table 20.6). Japanese defense manufacturers have become accustomed to the award of contracts largely free from major domestic or foreign competition, and that even if they fail to secure the lead contract they are certain—through a process known as *sumi-wake*—to receive a share of subcontracting work. JMOD and METI have used the contracting system to build national champions in the defense sector, with MHI emerging as the leader in fighter aircraft, KHI and IHI in transport aircraft, and IHI in aircraft engines. The Japanese government in the past has also provided *de facto* subsidies for R&D of key weapons systems, even though it has preferred private companies to bear these costs if possible. These national *kokusanka* projects in the past have included the YS-11 commercial airliner with eventual military applications in the 1950s; the T-1 fighter trainer in the 1960s; the C-1 transport in the 1960s and 1970s; the F-1 fighter in the 1970s; and attempted indigenous production of the FSX support fighter in the 1980s.

Secondly, defence production has in the past provided, if not spectacular, then steady profits. An element of risk is involved as JMOD does not provide an order down-payment, or even full payment with the first deliveries of defense equipment, preferring instead deferred payments over a number of years to increase budget flexibility. All the same, defense contractors have operated with a strong sense of security. JMOD has been a dependable customer, always paying on time, and until recently there were no incidents of the government backing out of a contract.

Thirdly, Japanese corporations have been confident that the embedding of smaller scale defense production within their large civilian operations enables them to maximise R&D and manufacturing benefits for spin-on and spin-off.

Fourthly, as noted earlier, the Japanese defence market has been relatively protected from direct foreign competition. Japan has continued inward transfers of foreign technology, importing US weapons systems through FMS, such as the *Aegis* radar system, as they offer relatively low-risk, if not always low-cost, provision for the JSDF. More preferable still has been licensed production of systems such as the F-4J and F-15J fighters and engines, and P-3C patrol aircraft, to enable the learning and innovation of technologies. Japan has also in the past begun to utilise co-production with the US as in the development of the F-2 fighter, and the first tentative steps towards the transfer of military technologies through exemptions made in

the arms export ban for thirteen different bilateral cooperation projects with the US.

Overall, though, the Japanese defence market has been dominated by domestic procurement, with levels of around 90 percent from the 1950s all the way through to the early part of this decade. Japan's defence market has only experienced significant foreign penetration coinciding with the advent of the Abe administration, levels of domestic procurement falling to 77 percent in 2016 (Table 20.7). Japan has started to acquire highly expensive weapons systems from the US, including the F-35A and *Osprey* V-22, and looks set to procure more, including the *Aegis Ashore* system, as President Donald Trump's administration presses its ally to increase purchases of equipment as a *quid pro quo* for the US contribution to Japan's security.

Industry performance

Japanese successes in indigenisation

Japan has made significant headway in the post-war period in developing a model of autonomous 'techno-nationalism' and civilian-military integration. The government through national *kokusanka* projects, but more importantly through the careful nurturing of a select group of private defense contractors, has created a capable defense R&D and production base whereby much of the initial cost and technological risk of weapons development is offloaded to the private sector. The system's provision of a strong physical civilian-military infrastructure for defense production is demonstrated by the fact that it was estimated in the early 1990s that 90 percent of MHI's capital equipment for military production was available simultaneously for civilian use. MHI famously utilises the same workers to assemble military and civilian aircraft in the same facilities, and its M-90 MBT is built in the same final assembly area as forklift trucks and bulldozers.¹⁶ This mechanism of civilian plants sustaining military production has further enabled the maintenance of 'hotbed' facilities for the rapid expansion of MBT production from normal low annual production runs to higher levels in national emergencies. Japanese corporations have benefitted from significant inter-diffusion of civilian and military technologies: semi-conductors developed for civilian industry finding their way through 'spin-on' into Japanese missiles and radars; and composites for fighter aircraft finding 'spin-on' into use for civilian airliners, and milling techniques for mobile artillery adopted in electricity turbine manufacture.¹⁷

Japan has achieved notable successes in *kokusanka* and closed the gap in certain technological areas with other larger developed economies and military powers. Japan demonstrated that it was capable of building advanced destroyers; although it has remained dependent on licensed production of engines and FMS for *Aegis* air radar.¹⁸ Japan succeeded in rebuilding its aircraft defense production in the post-war period, using a mix of licensed and indigenous production for the F-86F, F-104J, F-4EJ and F-15J fighters, T-1,

Table 20.7 Changes in equipment procurement methods and sources (Unit: ¥100 million)

<i>Fiscal year</i>	<i>Domestic procurement</i>	<i>Commercial imports</i>	<i>Ratio (%)</i>	<i>Foreign Military Sales</i>	<i>Ratio (%)</i>	<i>Domestic procurement ratio (%)</i>
1950–1961	5,907	266	4.2	253	3.9	91.9
1962	975	76	7.0	41	3.7	89.3
1963	931	70	6.0	162	13.9	80.1
1964	1,120	70	5.6	60	4.8	89.6
1965	1,359	82	5.4	65	4.3	90.3
1966	1,396	126	8.0	55	3.4	88.6
1967	1,859	131	6.4	62	3.0	90.6
1968	2,425	124	4.5	194	7.1	88.4
1969	2,703	128	4.4	53	1.9	93.9
1970	2,308	158	6.2	51	2.0	91.8
1971	3,534	124	3.3	116	3.1	93.6
1972	3,477	358	9.0	117	3.0	88.0
1973	3,697	164	4.1	182	4.5	91.4
1974	4,372	152	3.3	89	1.9	94.8
1975	4,845	160	3.1	107	2.1	94.8
1976	5,197	166	3.0	122	2.2	94.7
1977	5,846	222	3.5	194	3.1	93.4
1978	7,126	209	2.5	1,014	12.1	85.4
1979	7,373	394	4.5	884	10.2	85.2
1980	10,506	567	4.8	801	6.7	88.5
1981	8,158	604	6.0	1,368	13.5	80.5
1982	12,425	618	4.4	978	7.0	88.6
1983	12,673	598	4.3	758	5.4	90.3
1984	12,791	787	5.6	528	3.7	90.7
1985	13,417	636	4.3	707	4.8	90.9
1986	14,075	748	4.8	682	4.4	90.8
1987	14,788	787	4.8	670	4.1	91.0
1988	16,209	502	2.8	1,035	5.8	91.3
1989	17,497	928	4.8	923	4.8	90.4
1990	18,103	834	4.1	1,376	6.8	89.1
1991	17,010	869	4.6	1,023	5.4	90.0
1992	17,676	1,011	5.3	474	2.5	92.2
1993	16,408	1,356	7.0	1,574	8.1	84.8
1994	17,349	1,195	6.1	1,056	5.4	88.5
1995	18,131	914	4.7	598	3.0	92.3
1996	18,725	938	4.6	541	2.7	92.7
1997	18,479	1,173	5.9	376	1.9	92.3

(Continued)

Table 20.7 (Cont.)

<i>Fiscal year</i>	<i>Domestic procurement</i>	<i>Commercial imports</i>	<i>Ratio (%)</i>	<i>Foreign Military Sales</i>	<i>Ratio (%)</i>	<i>Domestic procurement ratio (%)</i>
1998	17,344	1,127	6.0	348	1.8	92.2
1999	17,704	1,185	6.1	390	2.0	91.8
2000	17,685	1,249	6.5	439	2.3	91.3
2001	17,971	1,156	5.9	489	2.5	91.6
2002	17,218	1,326	6.8	1,101	5.6	87.6
2003	17,598	1,292	6.5	1,006	5.1	88.4
2004	18,233	1,334	6.5	979	4.8	88.7
2005	18,917	1,525	7.1	937	4.4	88.5
2006	18,818	1,158	5.5	1,047	5.0	89.5
2007	18,649	1,327	6.8	856	4.1	89/5
2008	19,382	1,153	5.4	642	3.0	91.5
2009	18,219	1,290	6.4	620	3.1	90.5
2010	17,611	1,023	5.3	551	2.9	91.8
2011	21,746	1,471	6.2	589	2.5	91.3
2012	20,672	1,216	5.2	1,372	5.9	88.9
2013	18,512	1,204	5.8	1,118	5.4	88.9
2014	19,431	2,245	9.5	1,874	8.0	82.5
2015	19,264	1,631	6.4	4,473	17.6	75.9
2016	21,195	1,515	5.5	4,770	17.4	77.1

Source: *Bōei Nenkan*, various years.

T-2, and the T-4 trainer aircraft, and the C-1 transport. Japan displayed considerable success in missile programs, first purchasing direct or employing licensed production and then substituting with indigenous production.

Japan's policy of *kokusanka* has clearly not been without past problems, including the sheer cost that have raised questions about the sustainability of the defense production model. Much of the equipment produced has not always reached the highest international military performance standard. The F-1 most prominently becoming obsolete almost as soon as it went into production. Japan has also been frustrated in attempts to indigenise systems by pressure from its US ally. Japan in the end refrained from production of its own PXL patrol aircraft and settled for licensed production of the P-3C; and had to settle for co-development of the F-2 with the US. But despite Japan's failure to produce completely indigenous or internationally competitive major weapons platforms, it has scored important successes in an overall strategic industrial sense, in that it has managed to indigenise the most important component technologies of these platforms. Japan, in spite of its relatively small defense production base, has at least kept in step with international competition,

and had the latent potential to move into producing fully independent weapons systems in the future.

New challenges: budget pressures, procurement inefficiencies, corruption, international collaboration

However, in the last two decades, serious deficiencies and concerns over sustainability have begun to emerge in Japan's defence production model. The initial challenge is one of resourcing limitations, given the stagnant or declining defence budgets for much of the period since the late 1990s and declining proportion for equipment procurement. Japan's budgetary strains have been compounded by the procurement practices and high costs endemic to its production model. Japan's nurturing of an indigenous defense production base amongst a few manufacturers and the absence of meaningful competition has inflated equipment prices. For example, it is thought that *kokusanka* has resulted in the F-2 costing three times the equivalent of an off-the-shelf equivalent such as the F-16C; and the M-90 was viewed as the most expensive MBT in the world due its low production runs.

The close relationship between defense producers and the JSDF as the sole customer has added further costs. The infamous practice of *amakudari* (literally 'descent from heaven'), or the placing of retired bureaucrats and uniformed officers on the boards of defense contractors, has meant that this interchangeable network of policy-makers and industrialists has lacked incentives to negotiate competitive prices. JMOD revealed in 2008 that over the previous five years there had been around 500 cases of retired JSDF personnel requiring permission under the JSDF Law to take up positions with commercial enterprises, including close to 200 former officers of colonel/captain rank and above, and that companies involved in JMOD recruitment were the most popular destinations, with MHI, NEC and MELCO top ranking.¹⁹ The JDA in 2006 revealed in the National Diet that in 2004 there had been a total of 718 retired JSDF personnel working in firms with JDA contracts, again mostly concentrated in MHI affiliates.²⁰

Moreover, these practices are thought not only to increase unit costs but also to give rise to structural corruption. The JDA's Central Procurement Office Defense and then its Defense Facilities Administration Agency (DFAA) were hit by corruption scandals in the late 1990s and 2000s relating to officials encouraging defense contractors to 'pad out' (*mizumashi*) procurement contracts. JMOD's most serious scandal came in 2008 when former Administrative Vice-Minister Moriya Takemasa, the ministry's top official, was convicted and jailed for receiving bribes to steer procurement contracts to trading companies.²¹

In addition, Japan's defence production base is challenged by reliance on techno-nationalist policies that risk leaving its defence industry behind in the development of internationally competitive technologies. Japan's emphasis on the indigenisation of technologies has run into the obstacle of the increasing

reluctance of the US and other states to provide FMS or licensed production of advanced weapons systems. Japanese industry estimates that the domestic content under licensed production of U.S. systems has progressively decreased, from 85 percent of the F-104, to 90 percent of the F-4EJ, and 70 percent of the F-15J, with a high black-boxed content for the F-15J, and 60 percent for the F-2.²² The National Institute of Defence Studies (NIDS), JMOD's academic research arm, produced a report in 2006 which questioned the degree to which the US can be relied on to allow Japan to maintain autonomous technology even in the case of co-development and co-production, arguing that the F-35 project demonstrates the US's disinclination to share technology fully with even its supposedly closest allies and partners.²³ Japan was further frustrated by the US's refusal to transfer the full or even a 'dumbed-down' less-capable version of the F-22 to its ally despite intense lobbying. Japan's highly limited international cooperation to date, especially in terms of co-development and co-production, due to its arms export ban, thus raised concerns of a 'Galapagos effect' due to Japan's isolation from the evolution of international defence production.²⁴ Hence, as other states have been perceived as forging ahead with consolidation of their defence companies domestically and internationally, and to initiate new multilateral weapons platforms to share technologies and costs through economies of scale, Japan has risked being left as a bystander and surpassed technologically, and over-dependent on its US ally.²⁵

Erosion of the defence industrial base

Japan's formerly close government-industry relationship has come under increasing stress. The Japanese government due to the budgetary squeeze cancelled for the first time in the contemporary period a procurement order for a total of 62 AH64D Apache Longbow helicopters after only ten were delivered, leading FHI to sue the government for ¥40 billion in licensing fees already paid to Boeing.²⁶ A number of Japanese companies are now beginning to exit the defense market altogether.²⁷ Since 2003, 20 subcontracting firms for fighter production have abandoned military procurements; for tank production, 35 have withdrawn from subcontracting and thirteen have gone bankrupt.²⁸ JMOD reported in 2010 that since 2005 another 56 subcontracting firms had exited fighter and tank production.²⁹ The DPC's membership shrunk from 84 members in 1997 to 66 in 2002.³⁰

Japan has even experienced the exit of large corporations from the defense market seeking improved prospects in civilian sectors. Japanese corporations have increasingly eyed the benefits of civilian aerospace, with military production as a share of total aircraft production dropping from over 80 percent of total aircraft in the 1980s to around 30 percent in this decade. MHI, KHI and FHI, the national defense aerospace champions, are now becoming more vested in the civilian aerospace market to compensate for the shrinking military market—the commercial market offering no barriers to international tie-ups

and greater economies of scale, and allowing them to use technologies originally developed for military use, such as composites, to focus instead on civilian airliners.³¹

JMOD has encouraged defense industry consolidation to realise economies of scale. Nissan Motors after its purchase by Renault exited the defense industry by transferring its aerospace division to IHI in July 2000, and Tōyō Tsūshinki transferred its defense electronics division to NEC in May 2004.³² In October 2000 IHI and SHI moved their military shipbuilding activities into IHI Marine United; in September 2001 IHI, KHI and Mitsui Zōsen formed a work share agreement; in October 2002 NKK and Hitachi integrated their military shipbuilding into Universal Shipbuilding; and in October 2002 KHI formed Kawasaki Zōsen, a new shipbuilding subsidiary.³³ However, JMOD's consolidation policy has been frustrated by the fact that the most manufacturers are civilian production-oriented, that their dual-use spin-on spin-off model cannot easily separate civilian from military production facilities, and thus have no incentive to rationalise their business to suit defence production imperatives.

Industry prospects: domestic reforms and international cooperation

New national projects and procurement practices

Japanese administrations have looked to address these existential challenges for the defence industrial base by supporting new *kokusanka* projects such as the P-1 patrol aircraft, C-2 transport aircraft (with hopes even that the C-2 might be convertible to a version for the civilian market) and Advanced Technology Demonstration-X (ATD-X), or now F-3, stealth fighter prototype. Japan has also built through dual-use technology a very effective space programme with military applications that forms an additional route to develop new technologies.³⁴ Nevertheless, Japan's procurement of frontline platforms of main-battle tanks, destroyers and fighter aircraft has continued to decline.

Japan has further attempted to stretch the resources available for the defence industry with more efficient systems and competitive tenders for procurement domestically and internationally, following a series of corruption scandals in the mid-1990s, and in 2015 established an Acquisition, Technology and Logistics Agency (ATLA) in an attempt to integrate and manage procurement more efficiently.³⁵ However, these reforms are in their early stages and appear to have yet yielded few gains, and will be further complicated by Japan's increasing imports of highly-expensive US weapons systems. For instance, Japan's indigenous C-2 transport unit cost was revealed in June 2018 as running 40 percent over estimates; similarly, the FMS unit cost for F35As has inflated by 50 percent; and the FMS *Aegis Ashore* system cost has doubled to US\$3.6 billion.³⁶

International cooperation and ending the arms export ban

Japanese policy-makers although still intent that the maintenance of a domestic defence production base is an essential component for national autonomy have begun to accept that *kokusanka* alone is not a viable approach. Instead, policy-makers have moved to try to revitalise the defence production base through exploring enhanced international cooperation with the US and now other international partners in line with its overall broadening of security policy.³⁷

Japan's primary impulse has inevitably been to strengthen defence production ties with the US as in the joint development and production of the SM-3 Block II-A interceptor missile for BMD and the procurement the F-35A fighter, with some off-the-shelf procurement but also Final Assembly and Checkout (FACO) and development of elements of the fighter's engine parts, radar, and electro-optical distributed aperture systems (EODAS), and participation in Autonomic Logistics Global Sustainment (ALGS) system.³⁸ ALGS creates under the unitary direction of the US and prime contractor Lockheed Martin a global supply chain for the mutual provision of parts amongst countries deploying the F-35 Joint Strike Fighter platform (potentially incorporating the US itself, the UK, Italy and the Netherlands, Australia, Canada, Denmark, Norway and Turkey as Tier 1, 2 and 3 partners; and Singapore and Israel as Security Cooperative Partners).

However, Japan's breach on its self-imposed ban on arms exports since 2014 has opened the way to explore additional partners for joint development, production and export of weapons technologies. Japan and the UK signed a Defence Equipment Cooperation Framework in 2013, and indicated in July 2014 the intention to work on the joint development of the *Meteor* air-to-air missile. Japan was also rumoured to have attempted to pitch sales of the P-1 to the UK, although the UK in 2015 chose to procure the Boeing P-8 *Poseidon* maritime patrol aircraft.³⁹ In March 2017, the JMOD announced that it would conduct a joint study with the UK MOD on a future combat fighter system.⁴⁰ Japan has been exploring similar defence and military technology cooperation with France since 2012 on unmanned submarine technology.⁴¹ Japan and Germany have started to discuss the exchange of technologies for armoured vehicles.⁴² Japan signed a defence technology sharing agreement with Italy in May 2017 concentrating on naval capabilities in naval guns, radar and patrol aircraft.⁴³ The JMOD is reported to be interested in a similar agreement with Sweden focused on submarine technologies.⁴⁴

Japan has been engaged in discussions with India for the transfer of Shin Maywa's US-2 search and rescue seaplane currently utilised by the MSDF. The two countries established a Joint Working Group (JWG) to explore export or licensed production of the US-2. The Japan-India Summit in September 2014 resulted in a Memorandum of Cooperation and Exchanges in the Field of Defence and directed the JWG to accelerate progress on a 'road map' for the transfer of the aircraft and its technology. The December 2015

summit signed off an ‘Agreement on the Transfer of Defence Equipment and Technology’ and further inched forward talks on the US-2.

Japan’s principal political and commercial efforts for the transfer of arms technology, outside the US-Japan alliance, and representing the best opportunity for transferring an entire platform have been focussed on ties with Australia. Japan and Australia as part of their ‘Strategic Partnership’ signed in July 2014 concluded ‘Agreement Concerning the Transfer of Defence Equipment and Technology’.⁴⁵ Japan subsequently entered the competition for Australia’s tender to replace its six *Collins*-class submarines with up to 12 new boats by 2030 and worth up to A\$50 billion. MHI and Kawasaki Shipbuilding Corporation sought, with strong encouragement from the Abe administration, export their *Sōryū*-class advanced air-independent propulsion submarine technology.

Japan’s attempt to export submarines ended, though, in failure in April 2016, losing the contract to France’s DCNS. Japan’s failure resulted from a number of factors, including: questions over the appropriateness of the *Sōryū* technology for Australia’s defence needs given that a longer range vessel may have been required; the evaporation of Australian domestic political support with the fall of the highly pro-Japan Tony Abbott government in September 2015; and, crucially, the lack of experience of Japanese defence contractors in competing in international markets manifested in limited bidding skills, lack of an offset strategy, wariness to agree to licensed production and reluctance to share advanced technologies.⁴⁶

Conclusion: future scenarios for Japan’s defence industry

Japan’s defence industry yet again stands at an important juncture for its continued vitality and even existence. Japanese policy-makers and defence producers have demonstrated impressive resilience in the post-war period in rebuilding and sustaining the domestic defence production model and a high degree of indigenisation. However, there is a growing awareness amongst the policy and industrial community that the existing model of ‘technonationalism’ risks death by a thousand cuts as the national resources and ability to keep pace with international technological developments are simply beyond Japan’s national reach, and thus there is a need to find a new way to strike a balance between maintaining domestic production and seeking international collaboration in order to attempt to preserve a measure of strategic autonomy and leverage in the US-Japan alliance and broader strategic contexts. Japanese domestic reforms of procurement processes may deliver more bang for the yen and international co-development and growth of exports are seen as the routes to sustain the existing model, although it is early days as yet for Japan down this path and to judge its efficacy.

Longer term, the evolution of Japan’s defence production policy could yet move in more radical directions largely dependent on the external security environment and the strategic choices it poses for Japan. The most likely strategic direction for Japan to follow is to continue the current one: strengthening

the alliance with the US and increase its contribution, including defence production, within this structure. This may mean some additional defence expenditure to satisfy US requests for 'burden sharing' that may enable Japan to support its indigenous defence industry as in the past. But it might also mean deeper integration of Japan's defence industry with that of the US on a range of joint projects, and perhaps even the near capture or demise of Japan's autonomous production base by the US if it is obliged more and more to purchase highly expensive off-the-shelf platforms from US contractors.

Another likely complementary, but possibly also alternative path, for Japan is to develop a range of bilateral and multilateral defence production partnerships outside the framework of the US-Japan alliance. Japanese exploration of this option has already been seen in efforts to develop collaborative ties with key European states, Australia and India. These may provide the shared technology and funding necessary to maintain or further elevate Japan as a truly internationally competitive defence producer and boost its leverage vis-à-vis its US ally and other states. However, this option will certainly be hard going given how nascent the defence relationships are, Japan's relative inexperience of international security cooperation outside the alliance, the US's overwhelming strategic-political leverage over Japan due to the US-Japan security treaty, and the fact that the most significant weapons platforms available for co-development for Japan are US in origin such as the advanced fighters and BMD.

The other and currently least likely option for Japan, and essentially dependent on a seismic shift in its security environment, is to try to truly go it alone in defence production at a much more ambitious scale. If Japan were to be in effect abandoned by the US as a security guarantor in the future, perhaps in the case of US recognition of North Korea as a nuclear power or reaching a strategic accommodation with China that does not take account of Japan's security interests, then there might be witnessed attempts by Japan to convert itself into a fully-fledged military great power. This would open the way for larger scale procurement of new types of systems for greater deterrent power, including deterrence by punishment. Hence, the scenario might be of Japan significantly expanding its defence budget and developing its own next generation of fighter planes, overt fixed-wing aircraft carriers, long-range missiles, cyber capabilities, and most significantly of all a nuclear weapons capability. Clearly, this would be transformational for Japan's defence industry and test fully the proposition that it has developed a latent set of technologies to enable it to leapfrog into becoming a military power capable of fully defending itself. Nevertheless, as noted above, such a scenario remains highly unlikely and the likely trajectory for now is for Japan to attempt to preserve the existing model with more cooperation with the US and other powers but still looking to keep its long-term options open.

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