

Visual Analytics: Australian International Trade (1988–2023)

Uncovering trade patterns and dependencies to strengthen domestic manufacturing and export growth.

Prepared by: ANIKET SOLANKI

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1. Executive Summary

The following report shows data from 1988 to 2023 of The Australian International Trade Dataset from the Australian Bureau of Statistics (ABS) showing all of Australia's import and export operations for a wide range of goods. Australia is an important player in world trade, so it brings in and sends out a huge variety of goods. These can be broken down into 10 main categories and then into 67 sub-categories. This set of data records the trade prices in Australian dollars, which lets us look more closely at trade patterns, trends, and changes over time.

The analysis mostly looks at trends within the Machinery and Transport Equipment sector, with a focus on identifying key patterns, dependencies, and areas for improvement. The results show a significant dependence on imports, especially in subcategories like electrical machinery and road vehicles, which results in a trade gap. In these sectors, imports have continuously exceeded exports, leaving Australia mainly dependent on outside markets to provide its infrastructure and industrial requirements. Trade volumes have been affected by significant economic crises, such as the COVID-19 pandemic and the 2008 Global Financial Crisis, with large changes throughout these times. Nonetheless, the post-pandemic recovery has witnessed a boom in imports, particularly in machinery categories with high demand, highlighting Australia's reliance on these vital imports.

The report suggests that Australia invest in domestic manufacturing capabilities in order to fix this imbalance, especially in subcategories with significant demand, such as electrical machinery and road vehicles. Dependence on imports may be decreased, local job opportunities could be created, and economic resilience could be strengthened by promoting local production through trade protections, partnerships with foreign businesses, and governmental incentives. Furthermore, increasing the equipment sector's export potential could change Australia's trade profile to one that is more balanced or export-oriented, lowering the risks connected to disturbances in the global supply chain. Long-term economic benefits could result from Australia's ability to develop a more robust and independent industrial base.

2. Data Preparation

In order to make the graphs and understand the statistical and analytical pattern the data was transformed according to the requirement.

Raw Dollar Value

The export and import data was combined and made a single sheet with first part including only export and then import both increasing year by year.

Line	Trade	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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Figure 1: Raw Dollar Use

Statistical Pattern

A statistical pattern tell us about how much percentage of the total import and export contributed each year. This made it easier to compare things and find relationships. This step makes the data more consistent, which makes it easier to compare categories.

Additionally, each sub-category's contribution within its main category was calculated to further refine the statistical insights. This helps in identifying significant sub-categories under each main category.

Year	74 General	75 Office	76 Telecom	77 Electric	78 Road ve	79 Transpo	8 Miscelan	81 Prefabri	82 Furnitu	83 Travel	84 Bateria	85 Footwe	87 Professi	88 Photogr	89 Miscela	9 Commod	93 Special	195 Gold co	96 Coin	97 Gold, nc	98 Combin	1 TOTAL
Y1998	9.71%	14.69%	8.09%	11.99%	17.49%	15.97%	3.76%	2.54%	2.93%	0.36%	10.92%	1.86%	26.09%	20.08%	35.31%	12.92%	6.66%	1.17%	0.02%	66.48%	25.65%	100.00%
Y1999	9.57%	17.79%	8.25%	11.81%	22.22%	16.59%	4.17%	2.12%	3.50%	0.33%	9.13%	1.74%	27.70%	21.63%	33.66%	10.38%	20.04%	1.99%	0.09%	53.53%	25.45%	100.00%
Y2000	8.96%	11.24%	11.61%	12.03%	26.23%	10.31%	3.78%	2.01%	2.90%	0.34%	8.16%	1.56%	27.15%	25.43%	32.36%	9.15%	17.75%	0.82%	0.05%	49.05%	32.29%	100.00%
Y2001	9.41%	11.83%	9.80%	12.53%	30.70%	9.04%	3.73%	2.08%	3.24%	0.28%	8.08%	1.36%	28.28%	24.38%	32.20%	20.12%	0.55%	0.00%	46.48%	32.85%	100.00%	
Y2002	8.87%	11.34%	5.29%	12.14%	30.03%	16.90%	3.71%	2.87%	3.99%	0.34%	7.22%	1.29%	30.13%	16.36%	37.69%	9.60%	21.73%	0.59%	0.00%	46.26%	31.40%	100.00%
Y2003	10.02%	10.75%	6.26%	12.34%	32.94%	11.12%	3.97%	2.67%	3.69%	0.49%	7.73%	1.17%	28.13%	13.61%	43.10%	12.75%	19.63%	0.58%	0.00%	42.59%	37.19%	100.00%
Y2004	11.44%	9.42%	7.18%	12.84%	32.97%	7.27%	3.74%	2.25%	3.00%	0.48%	6.58%	1.00%	29.68%	12.87%	44.19%	11.22%	14.65%	0.82%	0.00%	42.68%	41.84%	100.00%
Y2005	11.37%	9.24%	6.04%	11.59%	32.61%	8.38%	3.19%	2.61%	2.95%	0.54%	6.10%	0.99%	33.78%	7.61%	45.52%	10.35%	14.01%	0.78%	0.00%	44.33%	44.80%	100.00%
Y2006	12.38%	9.71%	5.88%	12.60%	29.51%	7.57%	2.93%	2.25%	2.94%	0.52%	5.08%	0.90%	35.21%	7.45%	45.51%	12.14%	13.57%	0.76%	0.00%	46.06%	39.60%	100.00%
Y2007	12.09%	8.39%	6.38%	13.41%	29.74%	7.52%	3.01%	2.71%	2.17%	0.59%	4.76%	0.89%	35.77%	6.34%	46.73%	12.89%	6.22%	0.96%	0.00%	52.34%	40.49%	100.00%
Y2008	11.95%	7.79%	6.76%	12.15%	31.67%	9.16%	2.41%	2.05%	2.20%	0.60%	7.11%	0.95%	38.48%	6.58%	44.09%	10.20%	6.01%	1.83%	0.00%	62.04%	29.11%	100.00%
Y2009	14.82%	8.56%	8.45%	12.90%	21.01%	10.80%	2.58%	2.82%	2.13%	0.65%	4.56%	0.85%	41.28%	6.55%	41.16%	12.19%	8.12%	2.30%	0.00%	62.84%	26.76%	100.00%
Y2010	14.67%	9.67%	7.63%	12.63%	23.67%	8.24%	2.11%	2.96%	2.07%	0.64%	4.95%	0.86%	39.99%	5.46%	43.11%	10.58%	6.45%	2.33%	0.00%	59.04%	32.17%	100.00%
Y2011	14.58%	9.15%	7.74%	12.37%	20.19%	11.59%	1.98%	2.28%	1.89%	0.60%	4.82%	1.00%	37.42%	5.02%	47.07%	9.13%	5.37%	3.75%	0.00%	63.11%	27.47%	100.00%
Y2012	14.21%	8.34%	7.58%	11.87%	22.72%	11.71%	1.99%	2.74%	1.69%	0.73%	5.20%	1.00%	36.77%	4.84%	46.97%	9.19%	4.54%	3.21%	0.00%	68.18%	24.80%	100.00%
Y2013	13.98%	9.31%	8.34%	10.89%	22.53%	12.66%	1.92%	3.32%	1.71%	0.77%	4.73%	1.13%	37.18%	4.88%	46.28%	8.36%	5.23%	4.76%	0.00%	63.44%	26.57%	100.00%
Y2014	13.45%	10.41%	9.16%	10.50%	20.37%	15.13%	2.03%	2.71%	1.86%	0.82%	4.58%	1.26%	39.47%	5.31%	44.02%	8.00%	6.07%	3.34%	0.00%	63.27%	27.30%	100.00%
Y2015	13.49%	10.95%	16.62%	12.26%	20.82%	14.53%	2.52%	2.92%	2.04%	0.81%	4.58%	1.26%	39.47%	5.31%	44.02%	8.00%	6.07%	3.34%	0.00%	64.14%	26.37%	100.00%
Y2016	14.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	10.02%	11.75%	100.00%
Y2017	14.97%	8.38%	13.75%	12.62%	15.47%	15.06%	2.28%	2.10%	2.06%	1.02%	4.78%	1.68%	38.19%	6.23%	44.00%	8.47%	7.58%	2.65%	0.00%	69.04%	22.52%	100.00%
Y2018	14.96%	8.36%	13.08%	13.54%	11.03%	19.61%	2.11%	2.22%	0.99%	1.10%	4.61%	1.70%	37.94%	6.04%	44.33%	7.54%	5.28%	3.13%	0.00%	73.67%	17.91%	100.00%
Y2019	14.45%	8.50%	15.64%	12.54%	11.29%	18.88%	2.10%	1.91%	2.22%	1.15%	4.59%	1.49%	47.59%	5.68%	35.34%	7.86%	4.04%	2.81%	0.00%	76.23%	16.92%	100.00%
Y2020	14.74%	8.86%	15.43%	13.67%	10.89%	16.26%	2.03%	2.18%	1.84%	1.52%	5.25%	1.75%	47.80%	5.86%	33.81%	9.49%	3.09%	3.79%	0.00%	74.09%	19.04%	100.00%
Y2021	14.45%	8.34%	15.43%	13.67%	10.89%	16.26%	2.03%	2.18%	1.84%	1.52%	5.25%	1.75%	47.80%	5.86%	33.81%	9.49%	3.09%	3.79%	0.00%	74.09%	19.04%	100.00%
Y2022	15.07%	9.35%	14.15%	16.30%	12.19%	13.59%	1.53%	1.93%	1.83%	2.21%	7.15%	1.55%	48.57%	5.57%	31.22%	6.61%	1.95%	7.76%	0.00%	59.90%	30.37%	100.00%
Y2023	16.39%	7.97%	13.37%	15.87%	11.73%	13.83%	1.89%	1.61%	1.79%	1.79%	6.66%	1.74%	46.30%	4.99%	34.62%	7.40%	1.59%	7.85%	0.00%	68.66%	24.55%	100.00%

Figure 2: Export Statistical

Analytical Pattern

An analytical pattern tell us how much percent each category and sub-category changed from pervious year. It's easier to spot turning points, trends, and growth periods across trade categories.

Export	79 Transport & Miscellaneous	81 Prefabricated	82 Furniture	83 Travel goods	84 Articles of	85 Footwear	87 Professional	88 Photographic	89 Miscellaneous	9 Commodities	93 Special tr	95 Gold coin	96 Coin (excl	97 Gold, nor	98 Combined	1 TOTAL
Unit	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions	\$ Millions
Series ID	A1827865R	A1827866T	A1827867V	A1827868W	A1827869X	A1827870J	A1827871K	A1827872L	A1827873R	A1827874T	A1827875V	A1827876W	A1827877X	A1827878A	A1827879C	A1827880U
Y1988	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Y1989	127.33%	117.08%	90.32%	97.22%	150.00%	135.38%	164.29%	122.96%	90.25%	129.74%	100.82%	98.08%	104.59%	0.00%	96.86%	111.03%
Y1990	99.32%	103.49%	132.14%	120.00%	166.67%	142.05%	95.65%	104.56%	96.40%	98.81%	117.00%	121.57%	121.95%	#DIV/0!	132.82%	77.74%
Y1991	119.38%	109.35%	102.70%	85.71%	40.00%	113.60%	136.36%	123.41%	107.88%	103.78%	107.41%	105.91%	128.40%	0.00%	107.62%	101.07%
Y1992	111.75%	124.60%	239.47%	125.00%	200.00%	123.24%	120.00%	118.01%	130.00%	118.54%	111.54%	103.05%	90.03%	#DIV/0!	120.91%	93.62%
Y1993	119.30%	112.37%	50.55%	166.67%	250.00%	136.86%	144.44%	105.72%	131.66%	106.42%	105.76%	145.32%	76.82%	#DIV/0!	104.62%	112.90%
Y1994	77.66%	111.76%	104.35%	100.00%	130.00%	129.73%	107.69%	114.43%	108.54%	108.66%	103.22%	129.15%	110.81%	#DIV/0!	99.74%	110.08%
Y1995	144.48%	111.73%	135.42%	114.67%	92.31%	104.86%	112.50%	105.63%	109.73%	117.03%	107.92%	111.29%	66.26%	#DIV/0!	112.67%	95.12%
Y1996	102.46%	112.71%	130.77%	115.12%	116.67%	112.25%	101.59%	127.08%	109.06%	107.12%	102.99%	119.81%	77.30%	#DIV/0!	99.49%	119.47%
Y1997	154.73%	108.61%	102.35%	97.98%	100.00%	110.91%	92.19%	119.13%	115.05%	100.48%	97.41%	104.33%	101.59%	#DIV/0!	94.02%	109.22%
Y1998	88.09%	109.43%	97.70%	101.03%	85.71%	97.07%	105.08%	122.82%	100.90%	113.14%	168.87%	144.53%	105.47%	200.00%	155.23%	241.64%
Y1999	107.17%	108.44%	90.59%	129.59%	100.00%	90.68%	101.61%	115.14%	116.84%	103.39%	78.43%	235.90%	72.59%	400.00%	62.94%	77.85%
Y2000	70.60%	115.04%	109.09%	95.28%	116.67%	102.72%	103.17%	112.75%	135.33%	110.57%	111.98%	99.17%	84.69%	62.50%	102.95%	142.05%
Y2001	97.20%	109.50%	113.10%	122.31%	92.86%	108.53%	95.38%	114.05%	104.90%	108.97%	109.90%	124.55%	73.49%	0.00%	104.14%	111.81%
Y2002	191.85%	97.06%	133.68%	119.59%	115.38%	86.72%	91.94%	103.41%	65.14%	113.61%	103.40%	111.69%	111.48%	#DIV/0!	102.91%	98.85%
Y2003	57.71%	96.66%	76.38%	89.27%	140.00%	103.44%	87.72%	90.26%	80.41%	110.54%	119.99%	108.42%	117.65%	#DIV/0!	110.48%	142.10%
Y2004	62.82%	102.83%	102.06%	83.54%	100.00%	87.61%	88.00%	108.46%	97.26%	105.42%	96.00%	71.62%	136.25%	#DIV/0!	96.21%	108.01%
Y2005	126.67%	100.82%	117.17%	99.24%	114.29%	93.45%	100.00%	114.77%	59.61%	103.85%	108.96%	104.18%	103.67%	#DIV/0!	103.23%	116.65%
Y2006	89.29%	108.18%	93.10%	107.63%	104.17%	90.04%	97.73%	112.73%	105.92%	108.16%	138.00%	133.66%	133.63%	#DIV/0!	157.19%	121.98%
Y2007	105.28%	105.41%	126.85%	78.01%	120.00%	98.77%	104.65%	107.10%	89.66%	108.23%	109.23%	50.07%	138.41%	#DIV/0!	124.12%	111.70%
Y2008	135.23%	105.98%	97.81%	107.27%	106.67%	104.98%	113.33%	114.03%	109.97%	100.00%	104.48%	100.89%	198.56%	#DIV/0!	125.85%	75.12%
Y2009	91.72%	94.45%	106.72%	91.53%	103.13%	91.30%	84.31%	101.31%	94.05%	88.17%	105.61%	142.73%	132.77%	#DIV/0!	105.27%	97.08%
Y2010	78.44%	96.11%	100.70%	93.52%	93.94%	104.33%	97.67%	93.12%	80.12%	100.67%	102.09%	81.12%	103.27%	#DIV/0!	95.91%	122.71%
Y2011	144.74%	106.38%	81.94%	97.03%	100.00%	103.73%	123.81%	99.54%	97.74%	116.14%	97.68%	81.29%	157.47%	#DIV/0!	104.43%	84.24%
Y2012	106.79%	94.98%	114.41%	84.69%	116.13%	102.40%	94.23%	93.35%	91.54%	94.79%	95.34%	80.66%	81.70%	#DIV/0!	102.99%	82.75%
Y2013	110.65%	102.34%	123.70%	103.61%	108.33%	92.97%	116.33%	103.48%	103.36%	100.82%	96.20%	110.74%	142.35%	#DIV/0!	89.51%	106.18%
Y2014	129.06%	106.99%	87.43%	116.28%	112.82%	103.78%	119.30%	113.56%	116.26%	101.76%	97.09%	112.84%	68.14%	#DIV/0!	96.84%	99.74%
Y2015	104.76%	116.94%	126.03%	128.00%	102.27%	122.67%	120.59%	114.39%	136.36%	115.35%	106.31%	100.77%	118.03%	500.00%	107.76%	102.69%
Y2016	98.24%	104.06%	73.91%	103.91%	142.22%	108.25%	112.20%	104.07%	104.87%	104.61%	121.40%	120.05%	118.02%	20.00%	130.01%	101.34%
Y2017	99.69%	104.56%	105.88%	106.02%	109.38%	100.00%	125.00%	103.44%	104.40%	105.42%	92.97%	94.31%	68.45%	100.00%	93.44%	95.13%
Y2018	129.00%	106.29%	112.50%	107.80%	114.29%	102.44%	107.83%	105.57%	103.04%	107.09%	101.77%	93.01%	120.24%	0.00%	108.60%	80.90%
Y2019	108.93%	112.62%	96.91%	119.74%	117.50%	112.20%	98.39%	141.27%	105.91%	89.79%	118.04%	90.37%	105.77%	#DIV/0!	122.14%	111.55%
Y2020	74.41%	89.86%	102.55%	74.73%	119.15%	102.65%	105.74%	90.27%	92.70%	85.97%	112.22%	85.79%	151.34%	#DIV/0!	109.07%	126.27%
Y2021	83.28%	108.95%	126.09%	106.62%	103.57%	124.03%	92.25%	109.90%	104.86%	106.09%	107.34%	168.30%	197.70%	100.00%	91.33%	141.70%
Y2022	112.93%	112.95%	86.21%	114.48%	173.28%	135.21%	118.49%	113.78%	111.70%	107.11%	106.29%	42.71%	118.25%	450.00%	101.00%	128.42%
Y2023	115.01%	116.07%	97.14%	113.86%	94.03%	108.17%	129.79%	110.64%	114.23%	128.72%	105.19%	80.63%	66.02%	122.22%	120.58%	86.43%

Figure 3: Export Analytical

By doing these steps to prepare the data, the information was made more consistent, which made it easier to see and understand trade trends across all of Australia. This organised method, which includes raw, statistical, and analysis views, creates a solid base for the dashboard and storyboard visualisations that follow.

3. Main categories visualisation

In this part we will be understanding the Main categories statistical , analytical and raw dollar trend.

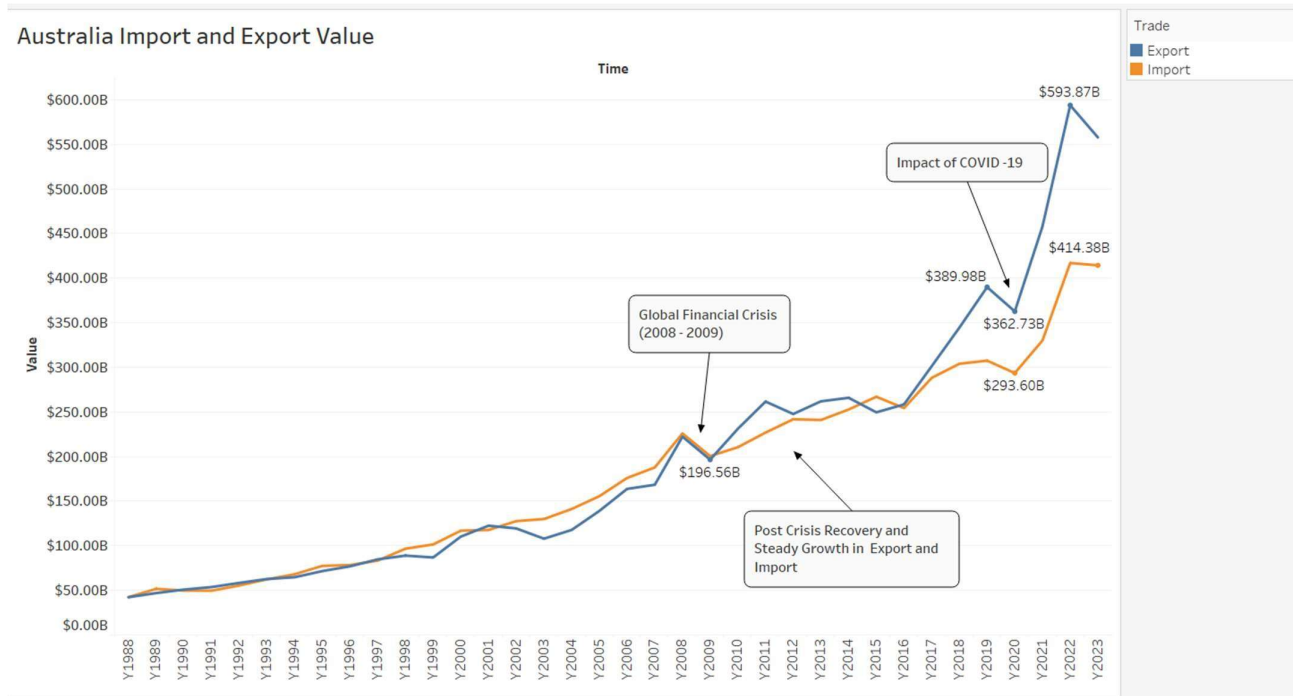


Figure 4: Australia Import and Exports Value

The graph shows that both imports and exports were steadily going up until the Global Financial Crisis (GFC) in 2008–2009, when trade temporarily slowed down. After the crisis, there was a slow but steady rebound, and both imports and exports kept growing.

The COVID-19 pandemic significantly impacted trade, with exports dropping to around \$389.98 billion and imports to \$362.73 billion.

In 2022, exports surged to \$593.87 billion, with imports reaching \$414.38 billion, marking a robust recovery and indicating strong demand for Australian goods in the global market.

The line chart is useful for displaying the trend over a long time period with important events specifically annotated. The use of separate colours for exports and imports makes it easy to track and compare their progress.

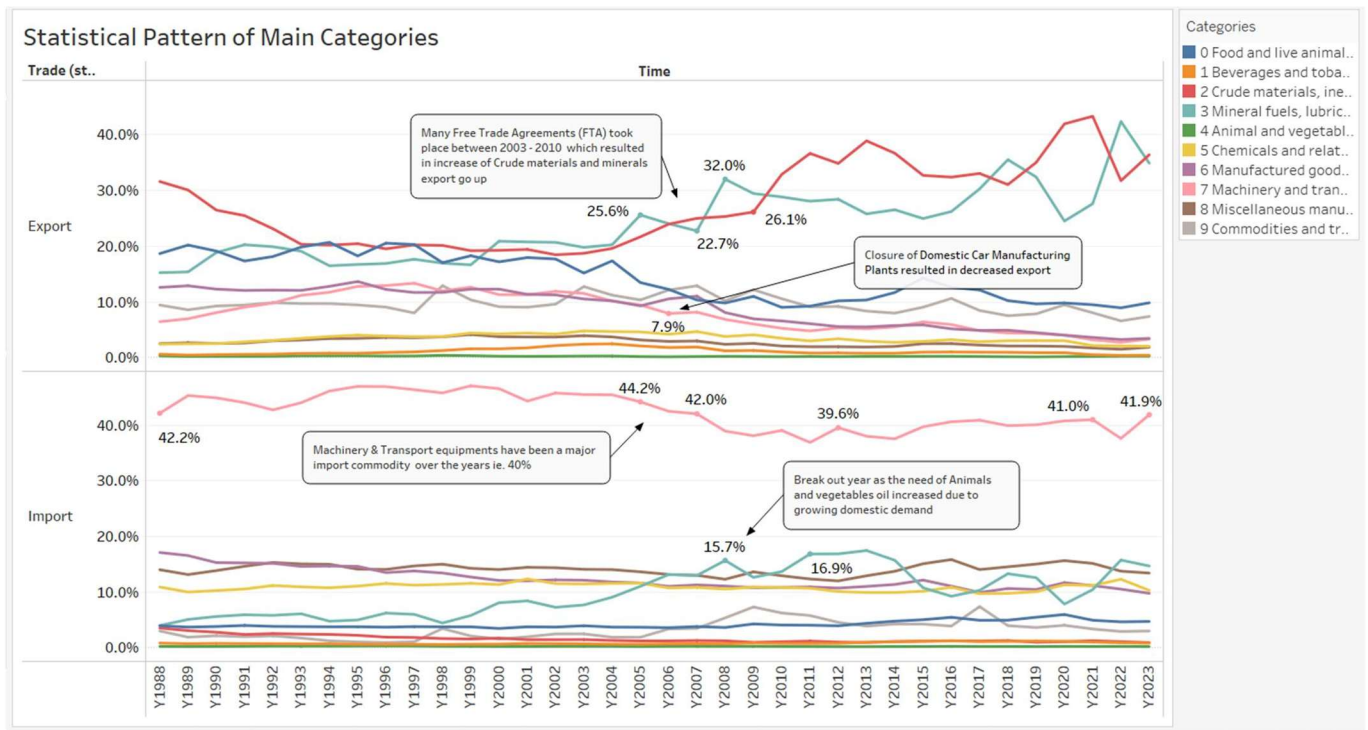


Figure 5: Statistical Patterns of Main Categories

Figure 5 showcases the statistical trends of the main categories, displaying the percentage contributions of each category in total imports and exports over time.

Exports are mostly made up of Category 2 (crude materials) and Category 3 (mineral fuels). Mineral fuels saw big rises from 2003 to 2010. Australia's Free Trade Agreements (FTA) and the desire for minerals around the world have helped this growth, which has led to a 32% rise in exports. At the same time, exports of Machinery and Transport Equipment (Category 7) went down. This was partly because local car factories shut down.

With a steady share of 40–44%, Machinery and Transport Equipment (group 7) is the most important import group. Australia relies on tools and transportation technologies that are brought in from other countries. The demand for Category 4 oils (animal and vegetable) goes up slightly, from 15.7% in 2013 to 16.9% in 2014. This may be because of higher demand in the United States.

These statistical trends show which types of goods make up the bulk of Australia's import and export trade. They show how changes in world demand and production capabilities affect trade.

Graphical techniques used, a line chart with annotations is used to compare exports and imports across categories. The visualization highlights significant events, like FTAs and plant closures, providing insights into changes in trade patterns. Each category may be easily identified by colour and comparisons across categories are improved with percentage-based scales.

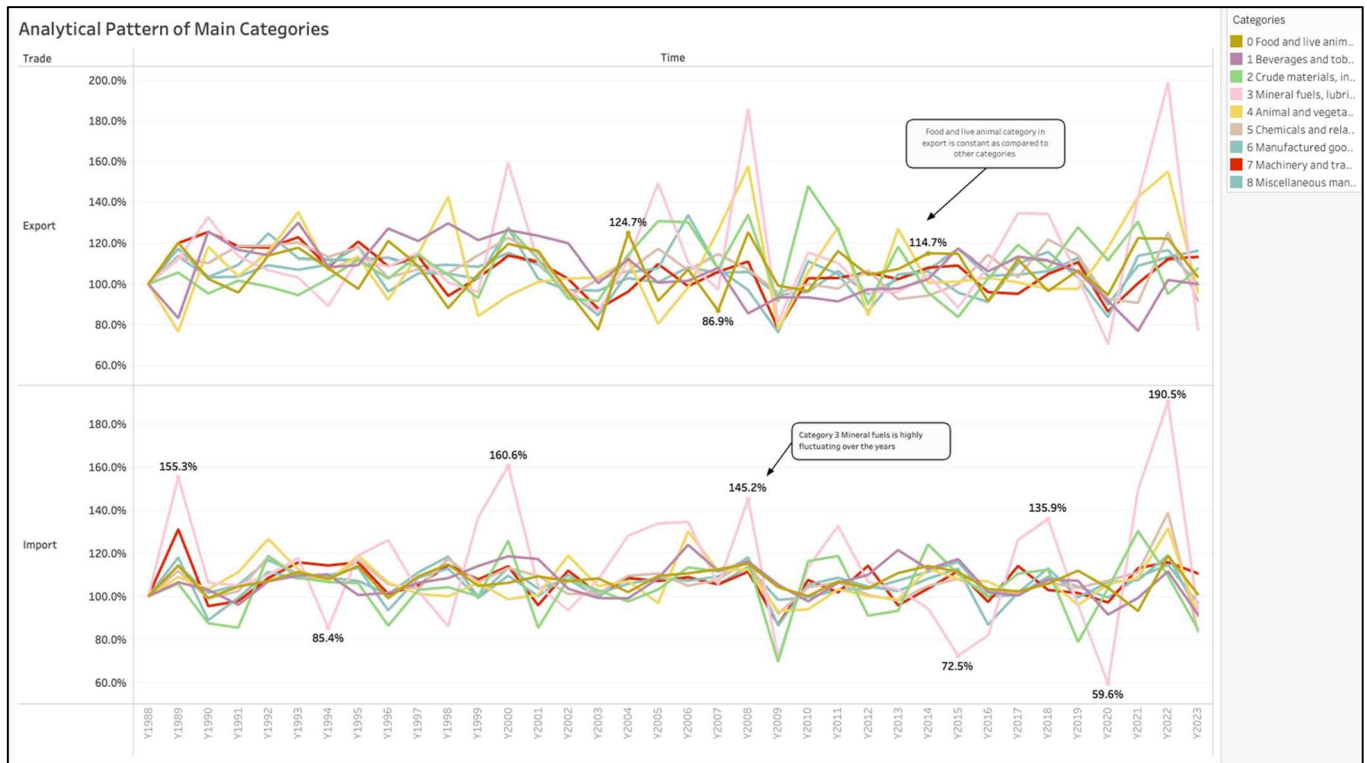


Figure 6: Analytical Patterns of Main Categories

Figure 6 shows the data trends for the main groups, showing how imports and exports changed from one year to the next. This analysis shows how volatile and fast the growth rates are in different groups.

Categories like Mineral fuels (Category 3) are very unstable, with growth rates that change a lot as the prices and demand for energy around the world change. Food and Live Animals (Category 0), on the other hand, show fairly constant export growth, which means that demand around the world stays the same.

The graphical technique used, a line chart with dual row for exports and imports, effectively compares these trends highlighting patterns across categories. Important information is provided by the annotations, which highlight particular points and enhancing clarity.

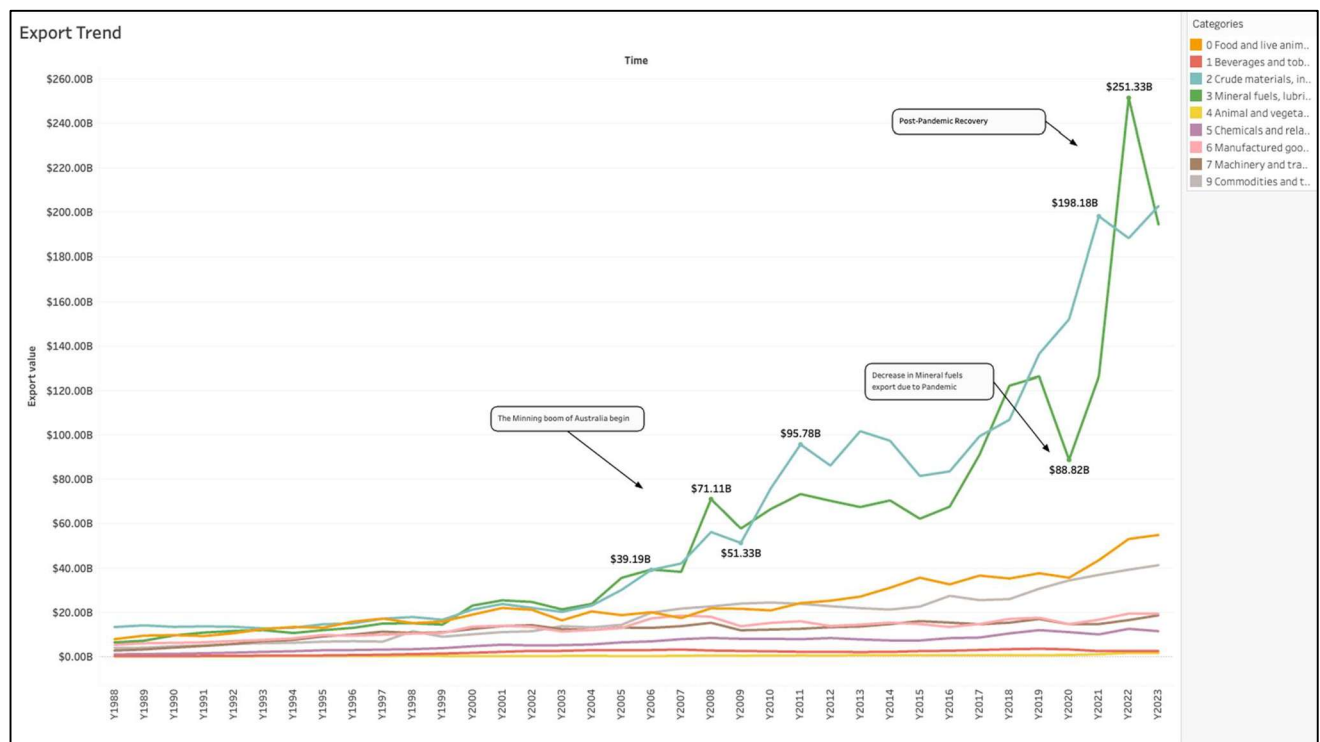


Figure 7: Total Export Trends

Figure 8 shows the trends in exports for different types of goods, with a focus on the big rise in exports of mineral fuels and crude materials. Exports in this category rose from about \$39.19 billion in the early 2000s to a high point of \$251.33 billion in 2022. This was due to Australia's mining boom and the following demand for raw materials on the world market. Some categories, like Animal and Vegetable Oils (Category 4), still have low export values, which means they are mostly used in the country where they are produced.

Graphical techniques used for this visualization, For easy understanding variations in export values across several categories, a line graph was used to show export patterns over time. This approach successfully draws attention to both general patterns and particular areas of concern, like unexpected rises or falls in exports. In order to provide history for important shifts, annotations were also included to indicate important economic events or interruptions, such as the start of Australia's mining boom and the effects of the COVID-19 epidemic. Quick distinction between kinds of goods is made possible by by color categories, which also make data interpretation easier.

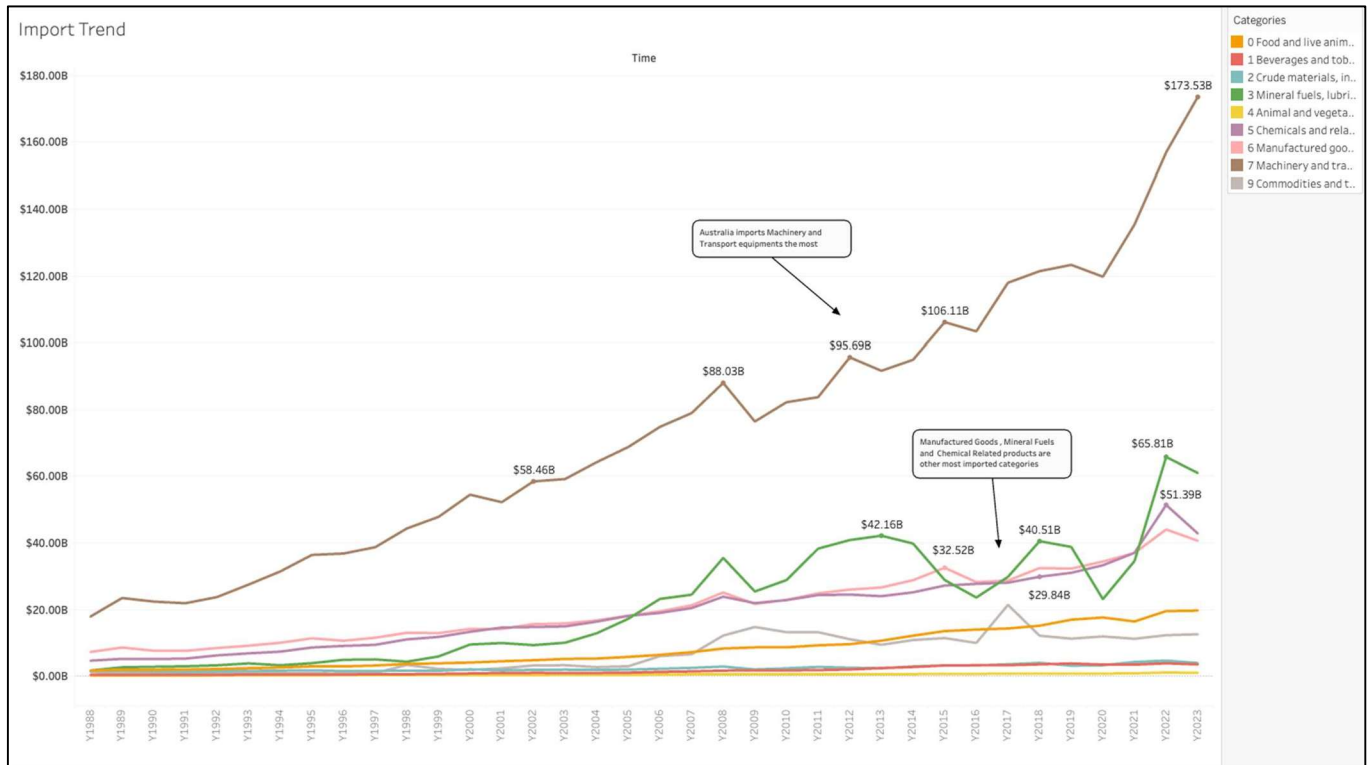


Figure 8: Total Import Trends

Figure 9 shows Machinery and Transport Equipment category consistently has the highest import value, growing from \$58.46 billion in the early 2000s to a peak of \$173.53 billion in 2023. This reflects Australia's reliance on foreign machinery and transport equipment to support its industries and infrastructure.

Besides machinery, Manufactured Goods (Category 6), Mineral Fuels (Category 3), and Chemicals (Category 5) are also significant import categories. For instance, Manufactured Goods and Chemicals show steady growth over the years, peaking at \$65.81 billion and \$51.39 billion, respectively, in recent years. These categories indicate Australia's dependency on global markets for processed and industrial goods.

Graphical Techniques: A clear and overall overview of import values over time is displayed via a line chart. Annotations and specific data points draw attention to significant peaks and point out the dominance of specific categories. Each category's trend gets easily identified by to the usage of colours by category.

4. Relationship between the main category and subcategories

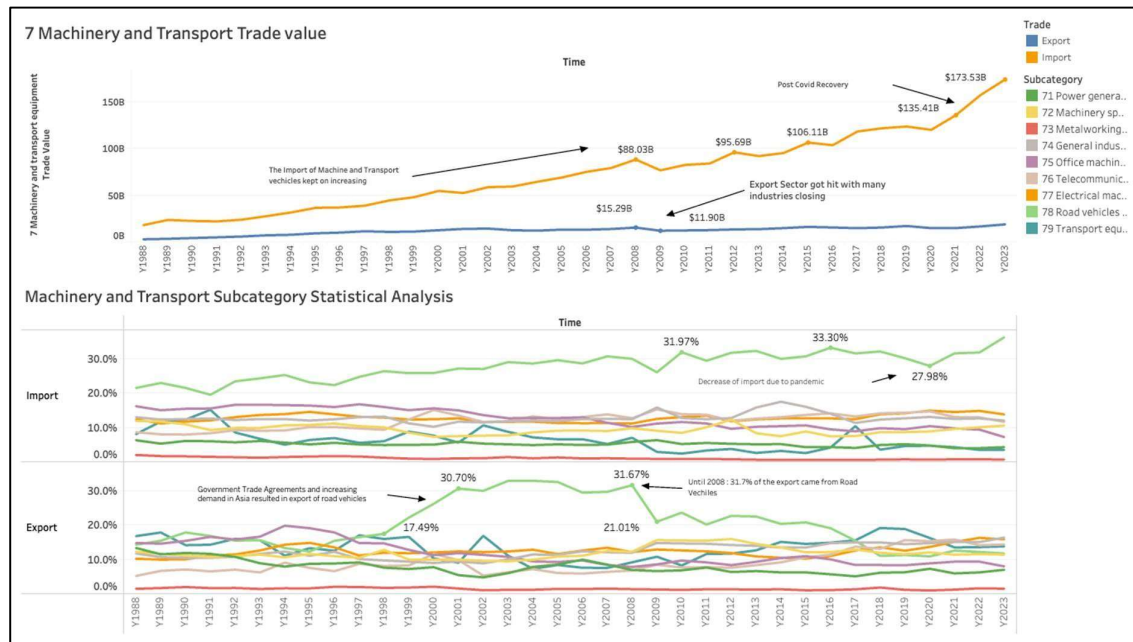


Figure 9: Machinery and Transport Category Trends

The general trends in importing and exporting Machinery and Transport Equipment (Category 7) from 1988 to 2023 are shown in Figure 10. This picture shows how trade values have changed and grown over time, pointing out important turning points.

The top chart highlights the steady growth in imports for Machinery and Transport Equipment, with values rising from \$15.29 billion in the early 1990s to a peak of \$173.54 billion in 2023. This increase aligns with Australia's infrastructure expansion and the need for foreign machinery and transport goods, especially in post-COVID recovery.

This category's exports are still quite small, suggesting a trade gap. The drop in exports, especially during the 2008 financial crisis, points to difficulties in Australia's equipment export industry, which may be brought on by a lack of home output and intense rivalry globally.

Road Vehicles (Subcategory 78): Road vehicles hold a big portion of imports, largely influenced by trade agreements and regional demand, peaking at 30.7% of total imports in the 2000s.

Telecommunications Equipment (Subcategory 76): This subcategory also shows strong import activity, reflecting global demand for telecom infrastructure and consumer electronics.

Graphical Techniques: The use of dashboard allows for a detailed analysis of both the overall trade values (top chart) and subcategory distributions (bottom chart). The chart effectively display import and export levels, while color-coded subcategories highlight the varying contributions within the category.

5. Relationships between subcategory.

The dashboard shows the patterns, trends, trade value and statistical information about Australia's trade in Category 7: Machinery and Transport Equipment subcategories. By putting together a number of different visualisations, these dashboard make it possible to look more closely at specific subcategory patterns for imports and exports.

Figure 11 shows how the subcategories for Machinery and Transport Equipment are broken down. There is a statistical analysis bubble chart, and pie charts of traded value on this dashboard.

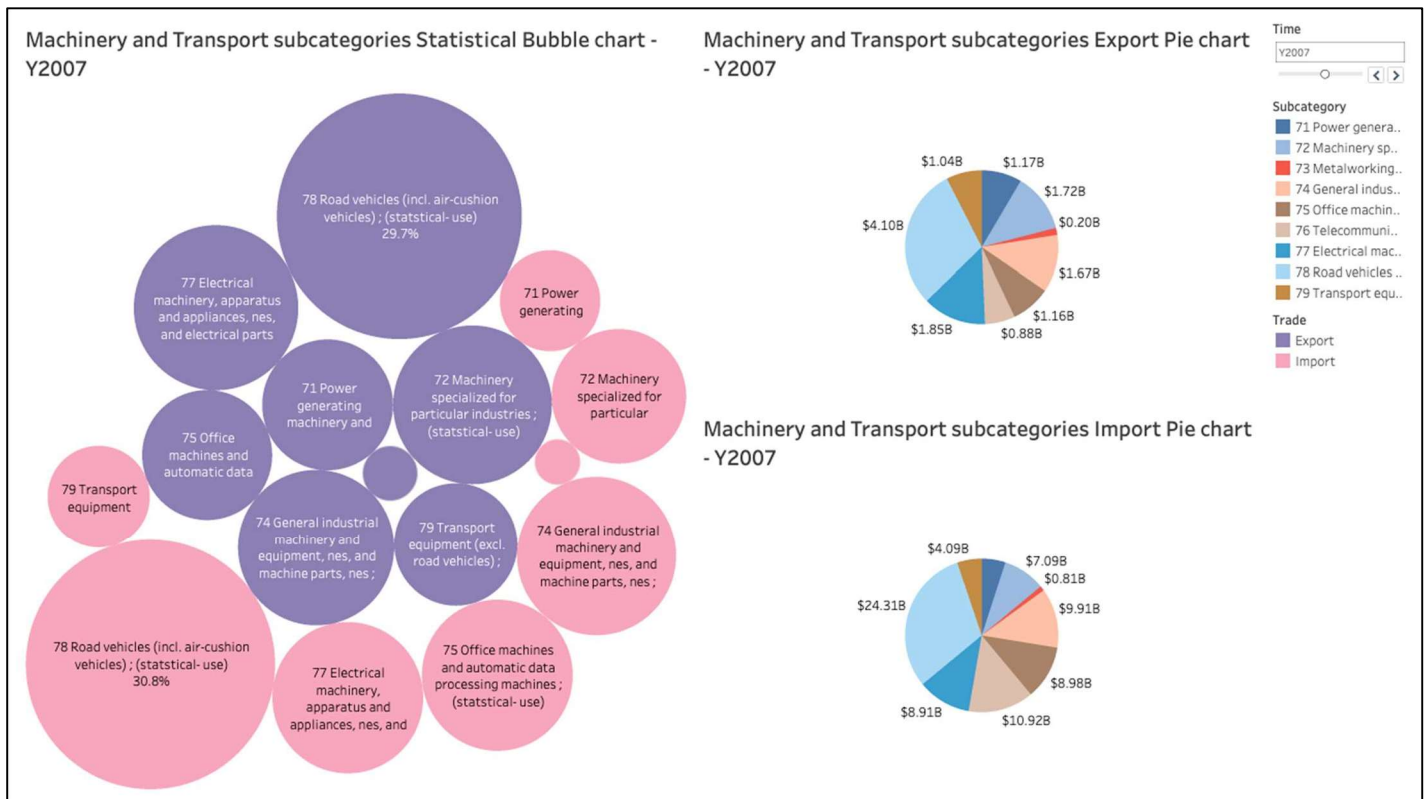


Figure 10: Machinery and Transport subcategories Statistical and Analytical

Bubble Chart (Statistical Overview): The bubble chart on the left illustrates the Statistical representation of different subcategories within the Machinery and Transport Equipment category. For example in the year 2017 Road vehicles (Subcategory 78) dominate, accounting for about 30.8% of imports and 29.7% of exports, highlighting the significant role of automotive trade in Australia's machinery imports and exports during 2007.

Export Pie Chart: The export pie chart shows the contributions of various machinery subcategories in Australia's export profile.

Import Pie Chart: The import pie chart further illustrates the dominance of road vehicles (Subcategory 78), which make up the majority of imports of transportation and machinery..

Graphical Techniques: The use of bubble chart visualizes the relative sizes of each subcategory, highlighting major trade areas, while the pie charts provide a straightforward comparison of import and export shares. Colouring by category allows for quick identification of dominant categories and insights into trade Inconsistencies.

6. Storyboard

The storyboard shows a important parts of Australia's trade patterns with other countries, mainly in the Machinery and Transport Equipment group. The storyboard is divided into seven separate story points that go into more depth about the overall trade trends, insights into specific categories, and a close look at subcategories within the machinery sector. Each story point gives a visual look at a different part of trade data, which helps to tell a full story about how Australia's trade works.

Australia Trade trend and analysis of Machinery and transport equipment Category

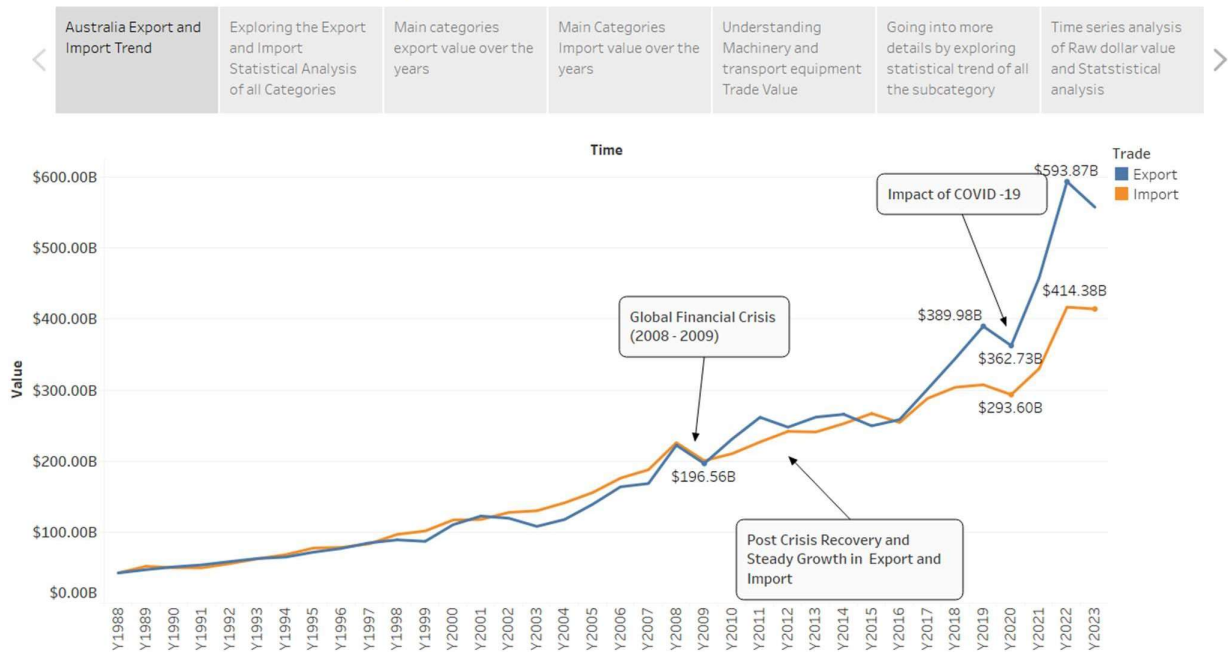
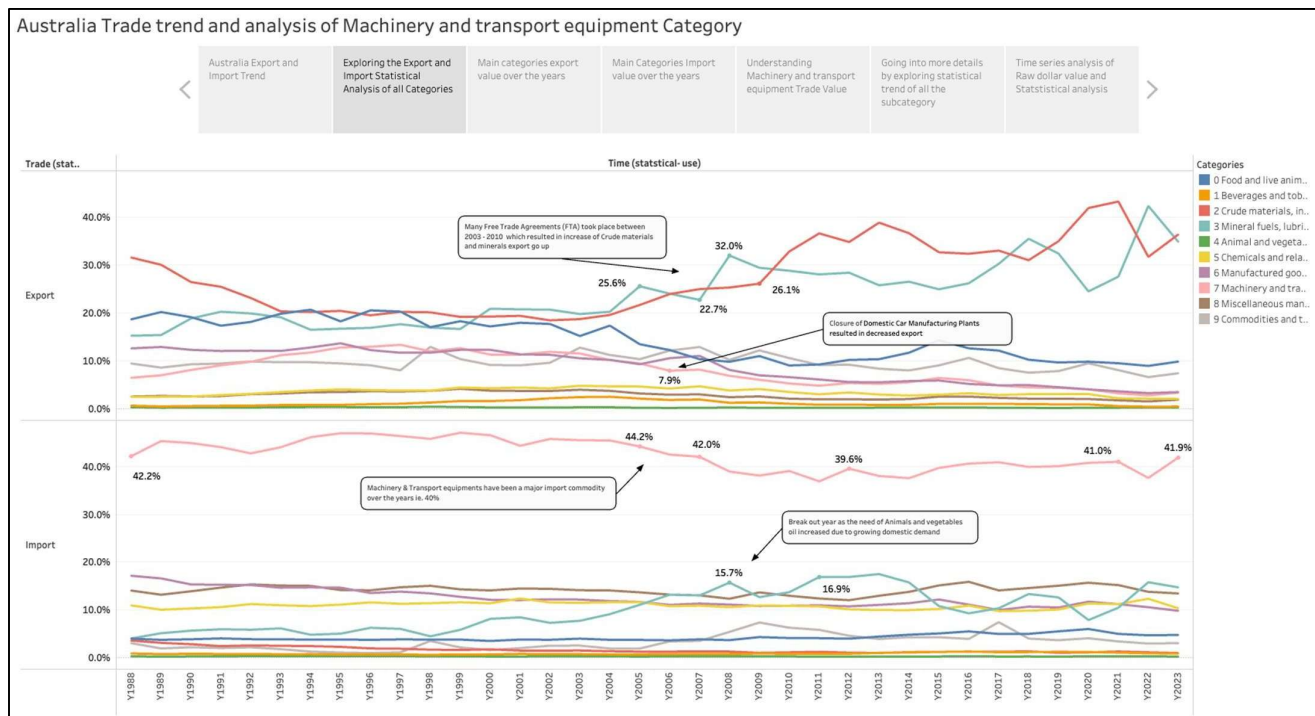


Figure 12: Australia's Export and Import Trends

The first part(Figure 12) shows how Australia's exports and imports have changed over time from 1988 to 2023. The Global Financial Crisis (2008–2009) and the COVID-19 pandemic (2020) are two examples of big economic events that had an effect on trade that are shown in this graph. Trade trends were clearly thrown off by both events, with temporary drops in both exports and imports. On the whole, both imports and exports are growing steadily. This introduction gives a broad background and sets the stage for more in-depth exploration of particular categories.



The second part (Figure 13) looks at how trade is statistically spread out among the main types of goods, showing how much each type of goods contributes to overall exports and imports over time. Mineral Fuels (Category 3) and Crude Materials (Category 2) make up most of the exports. On the other hand, Machinery and Transport Equipment (Category 7) always brings in the most goods, with about 40% of all imports. This statistical view helps you figure out what the main trade drivers are and how important each area is to Australia's trade profile.

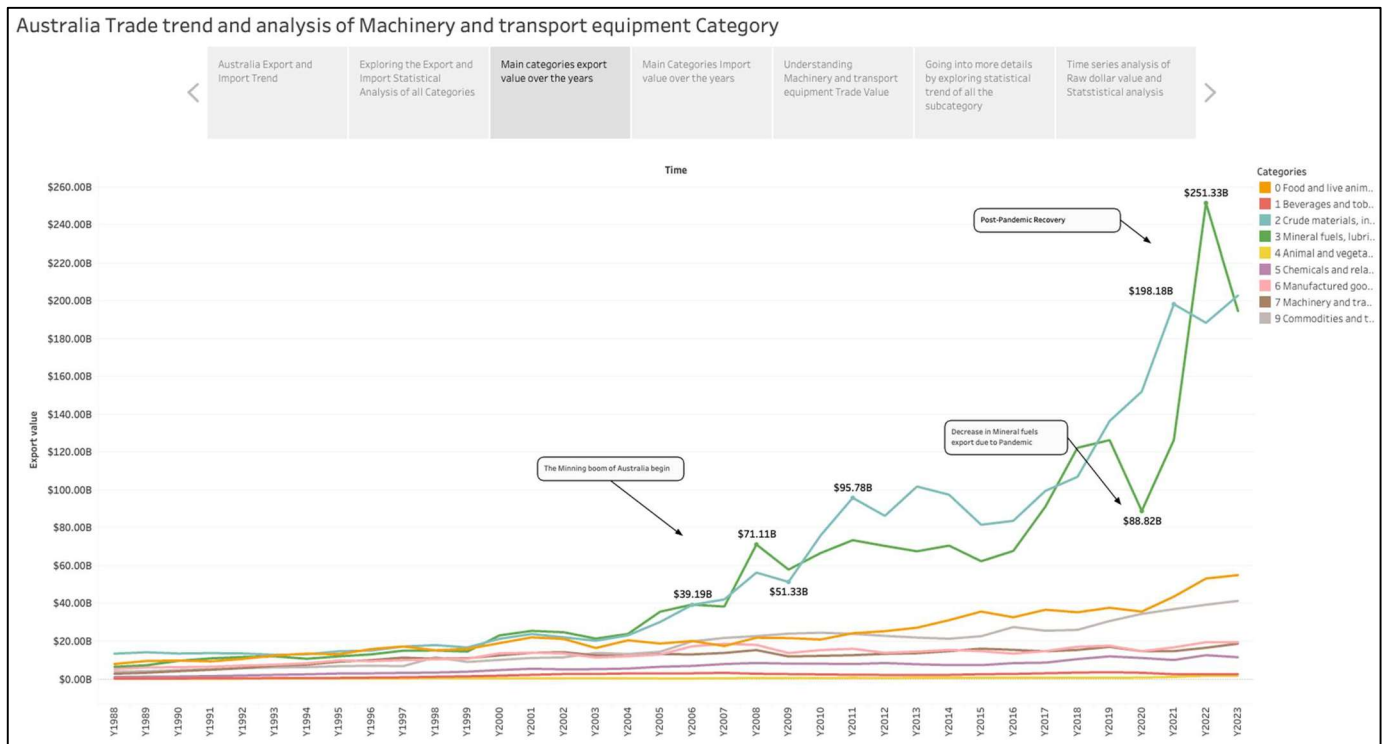


Figure 14: Main Categories Export Value

The third part(Figure 14) goes into more detail about how much each key category exports each year. In this case, Mineral Fuels shows a big rise after 2004, which is when the Australian mining boom happened. Also, crude products saw growth, which makes these two groups important for exports. The picture shows how much Australia's exports depend on raw materials, which makes the need for diversification even more clear. This point adds to the statistical information by giving absolute values, which make the size and economic impact of each group even clearer.

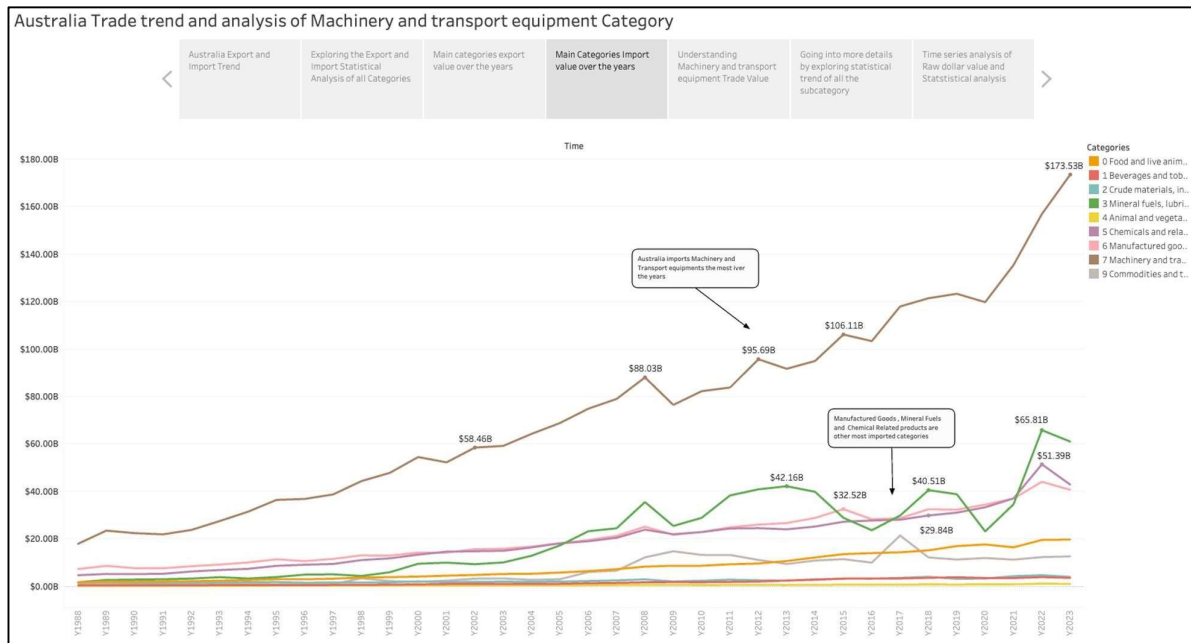


Figure 15: Main Categories Import Value

The fourth part (Figure 15) gives an outline of the values of imports each year by type. Machinery and Transport Equipment is still Australia's biggest import group. This shows how much the country depends on other countries for industrial and transportation goods. Imports of Chemicals and Manufactured Goods have also been steadily rising, which shows that Australia needs these important goods. This story point draws attention to the imbalance in the machinery group, which brings in a lot of goods but doesn't send many abroad.

The fifth part (Figure 16) is all about Category 7: Machinery and Transport Equipment. It shows a thorough breakdown of trends in imports and exports. This group's imports steadily went up until they reached a high point of \$173.53 billion in 2023. In the meantime, exports in this area have stayed pretty low, with only a small peak in 2007 and a decline in recent years, especially since many local factories have shut down. This story point shows how much Australia depends on imports in the machinery area, which is because the country can't make many of these things itself.

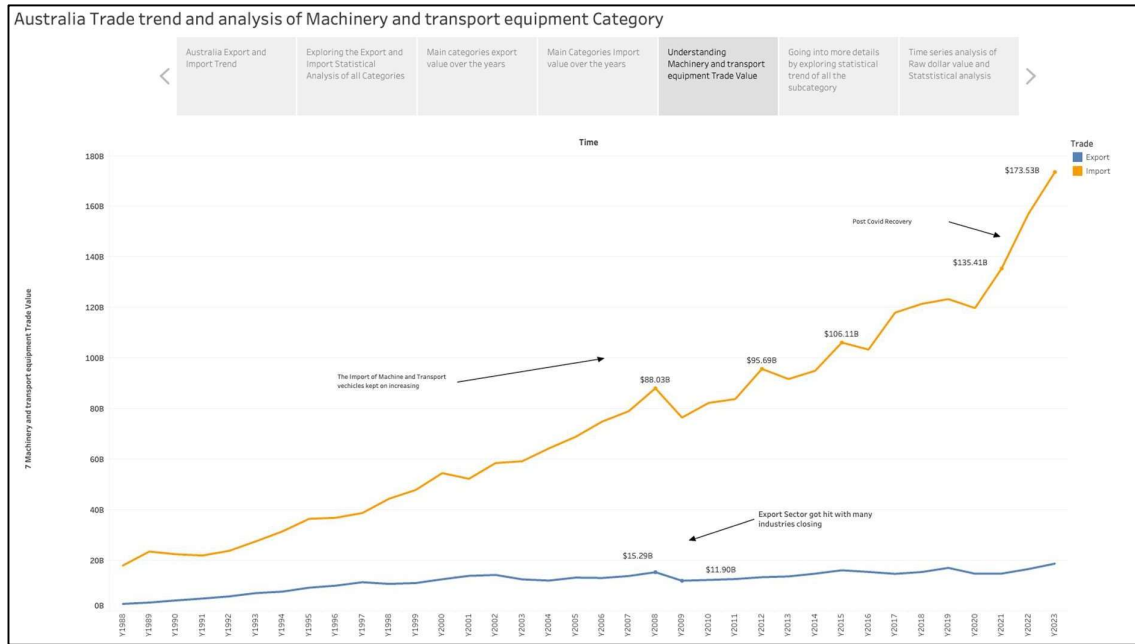


Figure 16: Machinery and Transport equipment trade value

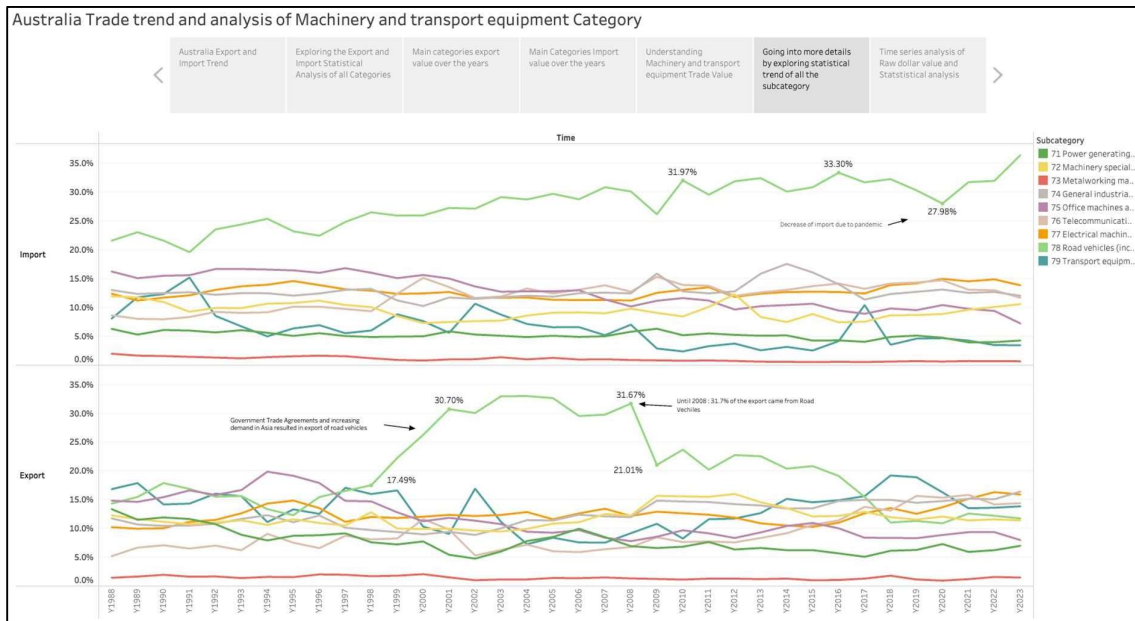


Figure 17: Machinery and Transport sub-categories trends

The sixth part (Figure 17) breaks it down even further. Because of steady demand for imported vehicles, road vehicles become the biggest subcategory of imports. When it comes to exports, road vehicles made up a big chunk until 2008. After that, exports went down because local production went down. The study also looks at how trade deals affect the sending of machinery abroad. This detailed breakdown shows how Category 7 is put together on the inside, including what kinds of machines are used to make trade possible.

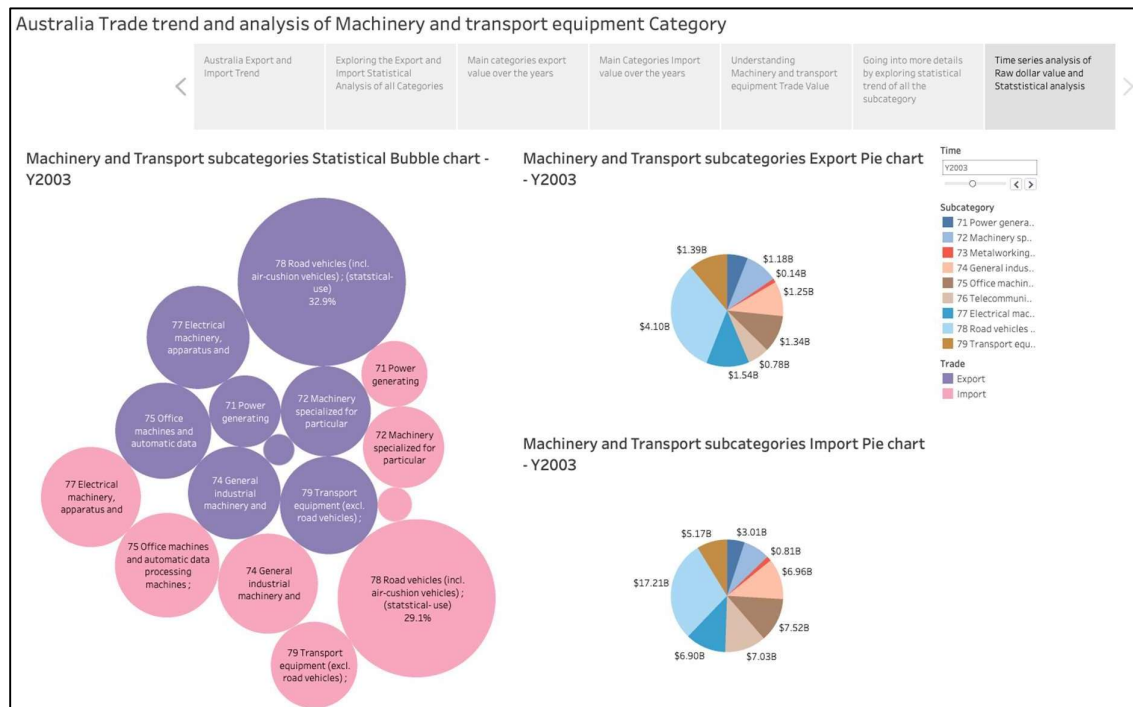


Figure 18: Time series analysis of Raw Dollar and Statistical Trends

The seventh part (Figure 18) combines a time series study of raw dollar values and statistical trends within Category 7. This lets you see both absolute values and proportional trends side by side. This graph shows how imports and exports change from one year to the next, and statistical trends show how category importance changes over time. By focusing on raw numbers and percentages, we can get a better idea of how different subcategories affect trade over time. For example, we can see trends like how imports of road vehicles are very volatile and how demand for electrical machinery is slowly rising.

Each story point in the storyboard builds on the one before it, leading the viewer through a story that goes from big-picture trade trends to specific insights into subcategories of the Machinery and Transport Equipment group. With this organised method, you can get a full picture of Australia's trade situation, showing its needs, weaknesses, and possible policy areas for action in the machinery industry.

7. Advantages of Dashboard and Storyboard

- **Dashboard:**

The dashboard approach provides several advantages for analysing and interpreting trade data. Dashboards allow users to explore data interactively, making it easy to identify trends, patterns, and anomalies across different time periods and categories.

This real-time interaction is very useful. For example, in the trade analysis, the dashboard allowed for quick comparisons between various subcategories, making it easier to assess import and export trends in a single view.

Dashboards are well-suited for users who need to focus on specific metrics or is analysing something.

- **Storyboard:**

On the other hand, the storyboard approach is excellent in giving an overall story and systematically guiding the viewer through important discoveries. By concentrating on the most useful results and relating them to wider economic or business effects, storyboards make complex information understandable to non-technical stakeholders, in contrast to dashboards, which are frequently more data-dense.

In this analysis, the storyboard method helped communicate the main findings around trade dependencies and the impact of economic events, allowing for a step-by-step explanation of trends and recommendations.

8. Findings and Recommendation

Australia's trade trends over the past 30 years have led to a number of suggestions for how to improve the country's trade balance and make its economy less vulnerable.

Findings:

- Australia's biggest import category has always been Machinery and Transport Equipment (Category 7). Demand has been steadily rising over the years and has hit \$173.53 billion by 2023. This reliance on foreign machinery shows how dependent Australia's transportation and manufacturing sectors are on each other.
- Subcategories particularly in high-demand are:
 - Road Vehicles (Subcategory 78)
 - Electrical Machinery (Subcategory 77)
- Imports consistently outpace exports, creating a trade imbalance and reflecting dependency on foreign markets for essential machinery and transport goods.

- Significant economic events
 - **2008 Global Financial Crisis** – caused fluctuations in trade volumes.
 - **COVID-19 Pandemic** – led to a temporary decline followed by a sharp post-pandemic recovery, especially in machinery and transport imports.
- Export activity in this category remains minimal, highlighting challenges in Australia’s local manufacturing capacity for these goods.
- Visual analysis suggests that Australia’s industrial needs are highly dependent on imports, particularly for infrastructure and automotive demands

Recommendations:

- **Invest in Domestic Manufacturing:**
 - Develop capabilities for high-demand subcategories production, specifically in road vehicles and electrical machinery.
 - Encourage local production through policy incentives, trade protections, or partnerships with international manufacturers.
- **Enhance Export Capacity:**
 - Focus on strengthening export activities in machinery subcategories to access global markets.
 - Shift Australia’s trade profile from high import dependent toward a more balanced or export-driven model.