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A brief overview of the dataset (Sandringham)

'A picture worth a thousand words', as the saying goes, visualization grants users to gain understanding of vast amounts of data. The following dataset is based on Sandringham, southern Sydney suburb in the Australian state of New South Wales and part of the St George area and is approximately 18 kilometres south of Sydney's central business district.

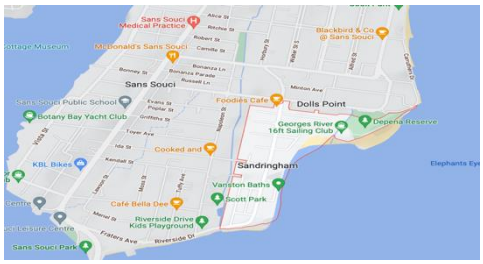

Figure 1Map of Sandringham

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016	Y2021
MedianFamilyWeeklyIncome		$1,436	$1,938	$2,097	$2,808
MedianHouseholdWeeklyIncome		$1,191	$1,534	$1,715	$2,101
MedianMortgageWeeklyPayment		$489	$644	$548	$686
MedianWeeklyRent		$299	$405	$470	$550
Population	1,117	1,236	976	1,238	1,275
MedianAge		44	43	46	47
Families	309	347	281	343	349
TotalPrivateDwelling	607	559	452	541	541
Married(%)	48.9%	56.9%	57.1%	54.0%	53.3%
Separated+Divorced(%)	13.2%	9.4%	9.8%	11.7%	12.0%
Widowed(%)	11.1%	7.8%	7.6%	6.1%	5.9%
NeverMarried(%)	26.7%	25.3%	25.5%	28.3%	35.7%
BirthInAustralia(%)	73.1%	70.3%	69.5%	68.5%	66.4%
Worked full-time(%)	64.6%	61.8%	59.4%	60.3%	
Worked part-time(%)	27.3%	28.7%	32.2%	28.8%	
Unemployment(%)	3.7%	3.0%	2.6%	5.8%	
PeopleTravelledToWorkByPublicTransport(%)			14.1%	15.4%	
PeopleTravelledToWorkByCar(%)			65.1%	69.6%	
AverageMotorVehiclesPerDwelling			1.6	1.8	1.9
CoupleFamilyNoChidren(%)	45.3%	40.9%	41.1%	40.5%	39.8%
CoupleFamilyHasChidren(%)	39.2%	46.4%	46.1%	46.0%	47.6%
OneParentFamily(%)	12.3%	10.4%	10.7%	12.3%	12.0%
OtherFamily(%)	3.2%	2.3%	2.1%	1.2%	0.9%
OccupiedDwellings(%)	84.2%	86.9%	90.3%	89.7%	93.7%
UnoccupiedDwelling(%)	15.8%	13.1%	9.7%	10.3%	6.7%
SeparateHouse(dwellings%)	48.3%	69.1%	74.2%	62.2%	63.5%
SemiDetached(dwellings%)	6.1%	13.8%	6.0%	8.6%	8.1%
FlatUnitApartment(dwellings%)	45.0%	17.1%	18.8%	29.2%	27.8%
0xBedroom(%)			0.0%	0.0%	0.0%
1xBedroom(%)			2.0%	1.1%	1.9%
2xBedroom(%)			32.9%	31.2%	27.1%
3xBedroom(%)			34.9%	37.3%	35.9%
4xBedroom+(%)			28.1%	29.1%	33.8%
AverageNumberBedroomsPerDwelling		1.1	3.0	3.1	3.1
AverageNumberPeoplePerHousehold		2.5	2.4	2.5	2.5
FullyOwned(%)	50.7%	44.7%	45.1%	44.8%	44.1%
OwnedWithMortgage(%)	15.3%	26.1%	28.3%	27.2%	28.4%
Rented(%)	27.0%	21.0%	24.1%	24.8%	23.0%
FamilyHouseHolds(%)	59.5%	68.9%	68.9%	72.2%	70.4%
SinglePersonHouseHolds(%)	33.7%	24.1%	28.0%	25.5%	28.2%
GroupHouseHold(%)	4.3%	3.1%	3.0%	2.4%	1.5%
LessThan$650WeeklyIncome(%)			22.0%	15.9%	15.9%
MoreThan$3000WeeklyIncome(%)			17.7%	25.7%	37.0%
HouseholdsRentPayments<30%Income (%)			89.3%	88.2%	51.8%
HouseholdsRentPayments>30%Income(%)			10.7%	11.8%	46.4%
HouseholdsMortgageRepayments<30%Income(%)			88.3%	91.3%	62.5%
HouseholdsMortgageRepayments>30%Income(%)			10.5%	8.7%	20.6%

Figure 2 Sandringham dataset used for analysis

The dataset used for Sandringham is from ABS (Australian Bureau of Statistics) and contains the following categories -

1. Property median price
2. House finance status
3. Ownership and household information
4. Dwellings information
5. Family information
6. Population and marriage status
7. Unemployment and employment status

The dataset includes collective data of 20 years clustered into – 2001, 2006, 2011, 2016 and 2021 for analysis.

The following study seeks to not only comprehend the wide range of property data categories and sources, but also to visualise property data and interact with tools often used in property market research analytics.

The categories in the dataset have more characteristic that can be used to analysis the dataset. Such as –

Property median price (House Price and Unit Price). **House finance status** (Personal Income, Family Income, Household Income, Mortgage and Rent). **Ownership and household information** (Fully Owned, Owned with Mortgage, Rented, Family Households, Single Households, Group Households). **Dwellings information** (Occupied, Unoccupied, Separated, Semi Detached, Flat Unit Apartment). **Family information** (No Children, Has Children, One Parent, Other Family). **Population and marriage status** (Married, Separated Divorced, Widowed, Never Married). **Unemployment and employment status** (Full-time, Part-time, Unemployment).

Visualisation 1. Supply and demand:

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016	Y2021
Population	1,117	1,236	976	1,238	1,275
TotalPrivateDwelling	607	559	452	541	541
Ratio for demand to supply	54.34%	45.23%	46.31%	43.70%	42.43%
Index	100.00%	83.23%	102.40%	94.36%	97.10%
AverageNumberPeoplePerHousehold		2.5	2.4	2.5	2.5
Demand need		494.4	406.7	495.2	510
Ratio		113.07%	111.15%	109.25%	106.08%

Figure 3 Supply and demand data

Population is total residents living in Sandringham and Total Private Dwelling is total supply of residential property available in Sandringham. Ratio for demand to supply can be obtain by dividing

Total Private Dwelling with population. Also, by dividing total population with average number of people per household, Demand need can be obtained. Index is calculated by dividing the ratio for demand to supply by last 5 years ratio.

Visualisation Technique (Figure 4)

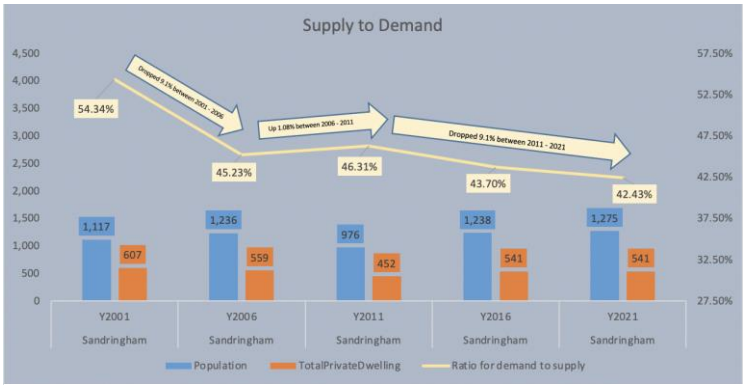

Figure 4 Supply and demand chart 1

A combination chart is great for displaying data measured on different scales in the same chart. The data above requires supply and demand in each year, as well as percentage changes over time, to be displayed in a single chart. As a result, the 2-D column and layered line with marker combination chart is employed here. Each year, 2D columns are used to illustrate the population and total private residence, while line with markers is used to visualise supply to demand ratio changes. Vertical axes have been rescaled to make more room and emphasise the differences. To tell a story, arrows and boxes containing summary of the chart are inserted, while grid lines are erased to declutter. The chart area and data series were color-coded. For better and faster understanding, data labels are moved and highlighted with appropriate colours, and explanations are also added.

Summary

The numbers indicate a decrease in both supply and demand over time, with a commensurate drop in the supply-to-demand ratio. It is also noticeable that even though the population increase in first 5 years 2001 to 2006, the population decrease significantly from 2006 to 2011. However, the population increase back in the following years. It is interesting that total private dwelling data also act the same way, as there has been decrease in the number from 2001 to 2011 and increase again in the following years. The ratio for supply to demand also suggest that there has been decrease steady decrease over the years as can be seen on the chart (figure-4).

Visualisation 2. Property price:

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham	
Time	Y2001	Y2006	Y2011	Y2016	Y2021	
MedianHousePrice	$780,000	$940,250	$1,290,000	$1,595,500	$2,522,500	
MedianUnitPrice	$375,000	$385,000	$540,000	$765,000	$678,000	
House Index	100.00%	120.54%	137.20%	123.68%	158.10%	
Unit Index	100.00%	102.67%	140.26%	141.67%	88.63%	

Figure 5 Property price

The dataset is extracted on the median house price and median unit price of Sandringham from pricefinder. Analysis is then done during the period of 2001 to 2021. As can be seen in the chart, there has been steady increase in house price. However, there seem to be decrease of unit price in 2021. The median house price in 2021 was increase by 35% compare to 2016 and the unit price was decrease by 53% compare to 2016.

Visualisation Technique (Figure 6)

For a full examination, median house and unit prices from 2001 to 2021 must be visualised with the display of trend lines in a single chart. This is best served by a trendline chart with markers, which can employ different coloured lines connecting prices in different years highlighted with markers for houses and units. Stacked lines with markers are thus employed here to show the changes in the values of houses and flats over time. After rescaling for space gain, the vertical axis was eliminated. A data table is added, followed by trendlines and up/down bars for simple comparison and comprehension.

Figure 6 Property price chart 1

Visualisation Technique (Figure 7)

The data requires the display of house and unit prices, as well as the percentage of change in both throughout the years. Only a combo chart can show data measurements in different scales on the same chart. As a result, a combo chart is used here. The clustered column chart on the primary axis depicts home and unit prices, while the stacked lines with markers on the secondary axis depict price changes over time. Vertical axes have been rescaled to emphasise differences and gain space. Colour scheme data labels were added to make the display more transparent. The chart area and data series were both color-coded.

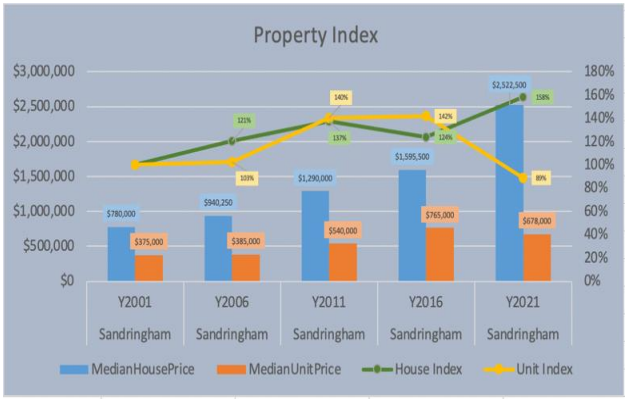

Figure 7 Property price chart 2

Summary

The price change of properties in Sandringham is more apparent than the price change of units throughout the 20-year period from 2001 to 2021. In these 20 years, the median growth in home prices was 58%, whereas unit price increases were just 41% until 2016. This occurred because the median unit price in 2021 fell 53% from 2016. The growth in housing prices was 37% in the first ten years between 2001 and 2011, and it proceeded by another 21% in the next ten years from 2011 to 2021, totalling 58%. The period from 2001 to 2011 showed a 40% spike in unit costs, contrasted by a 52% decline from 2011 to 2021.

Visualisation 3. Population:

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016	Y2021
Population	1117.00	1236.00	976.00	1238.00	1275.00
Married(%)	48.9%	56.9%	57.1%	54.0%	53.3%
Separated+Divorced(%)	13.2%	9.4%	9.8%	11.7%	12.0%
Widowed(%)	11.1%	7.8%	7.6%	6.1%	5.9%
NeverMarried(%)	26.7%	25.3%	25.5%	28.3%	35.7%
Index Ratio	100.0%	110.7%	79.0%	126.8%	103.0%

Figure 8 Population data

Visualisation Technique (Figure 9 & 10)

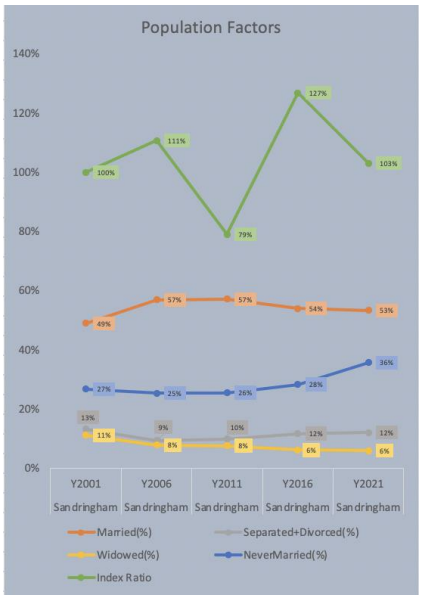

Figure 9 Population Factors chart

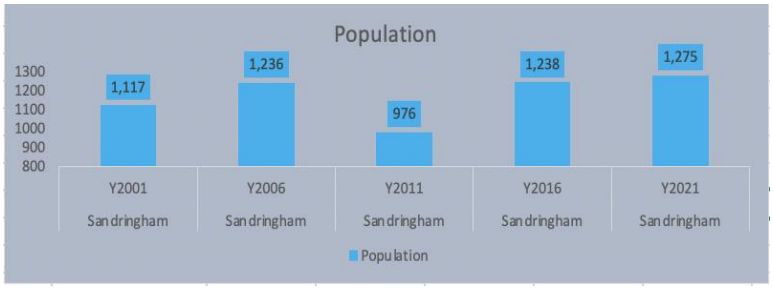

Figure 10 Population chart

Line charts are useful for displaying changes or patterns over time. Line charts, as compared to column or bar charts, may manage more categories and data points without becoming too cluttered. The data above requires the trend of its four factors. However, for the overall population, the column chart was used since column charts are useful for illustrating the distinction between values. Column charts, which are used to examine changes in data over time, are easier to read when the variances in data value are quite big. The chart area and data series were both color-coded and while grid lines are erased to declutter.

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham	
Time	Y2001	Y2006	Y2011	Y2016	Y2021	
Population	1117	1236	976	1238	1275	
BirthInAustralia(%)	73.1%	70.3%	69.5%	68.5%	66.4%	

Figure 11 BirthInAustralia data

Visualisation Technique (Figure 12)

Combination charts are appropriate when data contains distinct forms of information measured on different scales that must be displayed in a single chart. We have statistics on Australia's population from 2001 through 2021, as well as the percentage of births in those years, available here. As a result, a combination chart with clustered columns for the population and a stacking line with marks for the proportion of birth in Australia, is used. The vertical axes have been rescaled to better illustrate the difference. T formatted, and sized to make them more visible.

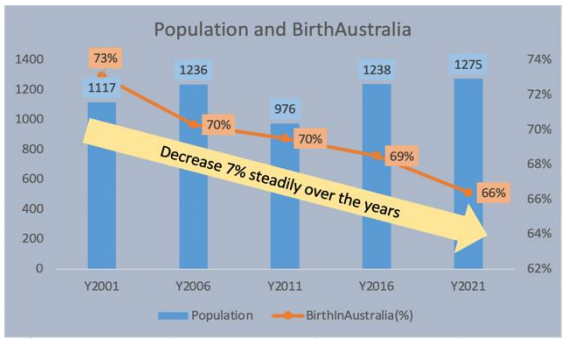

Figure 12 Birth in Australia chart

Location	Sandringham	Sandringham	Sandringham	Sandringham	
Time	Y2006	Y2011	Y2016	Y2021	
Population	1236	976	1238	1275	
MedianAge	44	43	46	47	

Figure 13 Median Age data

Visualisation Technique (Figure 14)

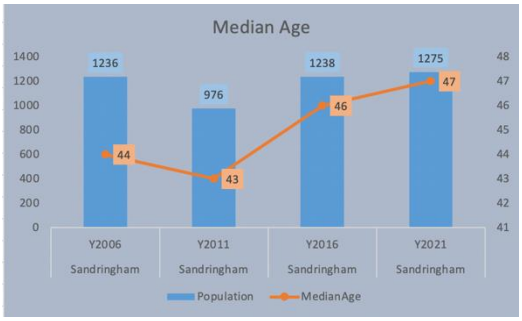

Figure 14 Median Age chart

When several forms of information from the data need to be displayed in a single chart, combination charts are the best option. The demographic statistics shown here includes the median age of the population for the years 2006 through 2021. Therefore, a combination chart with line for median age and clustered columns for population is used. For comparison, the vertical axes have been rescaled to emphasise the variation. Colour-formatted data labels and a legend are offered for improved comprehension and visual impact.

Summary

Sandringham's population has displayed fascinating tendencies over the last 20 years, with barely a 3% increase from 2001 to 2021. Throughout this time period, the median age of the population remained between 43 and 47, within the working age range. From 2006 to 2016, the percentage of births in Australia fell by 6.7%. There was an 8% increase in the never married group and a tiny but continuous 4% increase in the married category. Between 2001 and 2021, the widowed group decreased by 5% while the separated group remained practically constant at 1%. By looking at the dataset we can know that as the time passes, there will be more multicultural communities and the suburb will be a place with peaceful neighbourhood away from city life as the median age seem to get older.

Visualisation 4. Finance:

Location	Sandringham	Sandringham	Sandringham	Sandringham	
Time	Y2006	Y2011	Y2016	Y2021	
MedianPersonalWeeklyIncome	$535	$708	$764	$978	
MedianFamilyWeeklyIncome	$1,436	$1,938	$2,097	$2,808	
MedianHouseholdWeelklyIncome	$1,191	$1,534	$1,715	$2,101	
MedianMortgageWeeklyPayment	$489	$644	$548	$686	
MedianWeeklyRent	$299	$405	$470	$550	
HouseholdIncome Change	100%	129%	112%	123%	
MortgagePayment Change	100%	132%	85%	125%	
Rent Change	100%	135%	116%	117%	

Figure 15 Finance data

Visualisation Technique (Figure 16)

To visualise several data that are measured using various scales in one chart, a combination chart is excellent. The data above requires revenue and expenses for each year, as well as percentage changes over time, to be shown in a single chart. As a result, a combination chart with stacked lines and columns and markers is employed in this instance. While stacked columns are used to visualise the changes in the various revenue in each year, stacked lines with markers are used to show the mortgage and rental payments. To reduce clutter, grid lines were removed, and the chart area and data series were colour-formatted. For

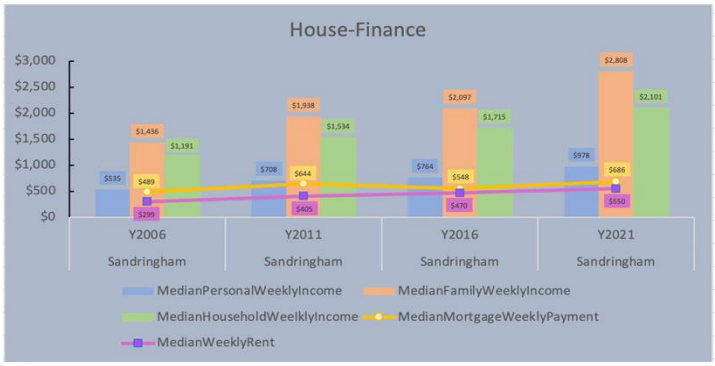

Figure 16 Finance chart

easier and quicker comprehension, data labels have been moved, highlighted with the proper colours, and legends have been added.

Summary

The economics of an area and the wellbeing of its residents are significantly influenced by affordable housing. During the period from 2006 to 2021, the weekly mortgage payments was declined by 7%, while the weekly rent was gradually reduced by 18%. Between 2011 and 2016, household income fell by 17%. The good news is that household income will rise by 11% between 2016 and 2021. As a result, the net earnings equal the rent payment but falls short of the mortgage payment in the past years.

Visualisation 5. Ownership:

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016	Y2021
FullyOwned(%)	50.7%	44.7%	45.1%	44.8%	44.1%
OwnedWithMortgage(%)	15.3%	26.1%	28.3%	27.2%	28.4%
Rented(%)	27.0%	21.0%	24.1%	24.8%	23.0%
FamilyHouseHolds(%)	59.5%	68.9%	68.9%	72.2%	70.4%
SinglePersonHouseHolds(%)	33.7%	24.1%	28.0%	25.5%	28.2%
GroupHouseHold(%)	4.3%	3.1%	3.0%	2.4%	1.5%

Figure 17 Ownership & Households data

Visualisation Technique (Figure 18)

When many sorts of information from the data need to be displayed in a single chart, combination charts are the best option. Here, we have information on two different categories: types of households and types of ownership. For this reason, a combination chart with clustered columns for the variety of ownership with three factors and lines with markers for the type of household with three variables is used. For easier comparison and better emphasis of the difference, the vertical axes have been rescaled.

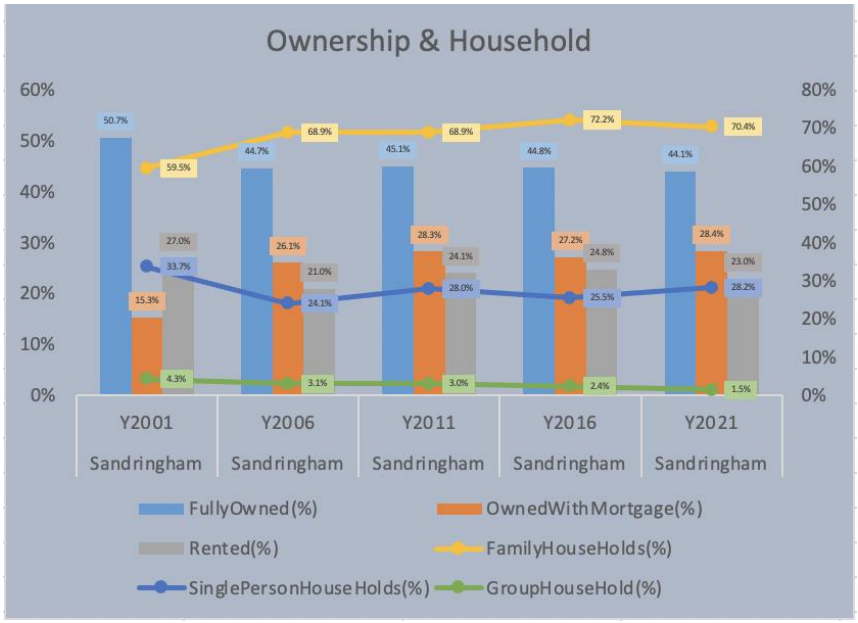

Figure 18 Ownership & Household chart

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016	Y2021
FullyOwned(%)	50.7%	44.7%	45.1%	44.8%	44.1%
OwnedWithMortgage(%)	15.3%	26.1%	28.3%	27.2%	28.4%
Rented(%)	27.0%	21.0%	24.1%	24.8%	23.0%
FullyOwned Change	100.0%	88.2%	100.9%	99.3%	98.4%
OwnedWithMortgage Change	100.0%	170.6%	108.4%	96.1%	104.4%
RentedChange	100.0%	77.8%	114.8%	102.9%	92.7%

Figure 19 Ownership changes

Summary

Between 2001 and 2021, family households in Sandringham saw a noteworthy growth of 10.9%, while single-person households saw a decline of 5%. The group family is, however, rapidly dwindling, with only 1.5% remaining in 2021. Fully owned property declined by 5% between 2001 and 2011, but very slightly increased by 1% between 2011 and 2021. However, there was a 13% increase in mortgage ownership from 2001 to 2011, and for the next ten years, through 2021, the percentage appears to have remained rather stable. Rentals appear to be declining, with a 4% constant fall from 2001 to 2021.

Visualisation 6. Workforce:

Location	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016
Worked full-time(%)	64.6%	61.8%	59.4%	60.3%
Worked part-time(%)	27.3%	28.7%	32.2%	28.8%
Unemployment(%)	3.7%	3.0%	2.6%	5.8%
Full-time change		95.7%	96.1%	101.5%
Part-time change		105.1%	112.2%	89.4%
Unemployment change		81.1%	86.7%	223.1%

Figure 20 Workforce data

Visualisation Technique (Figure 21)

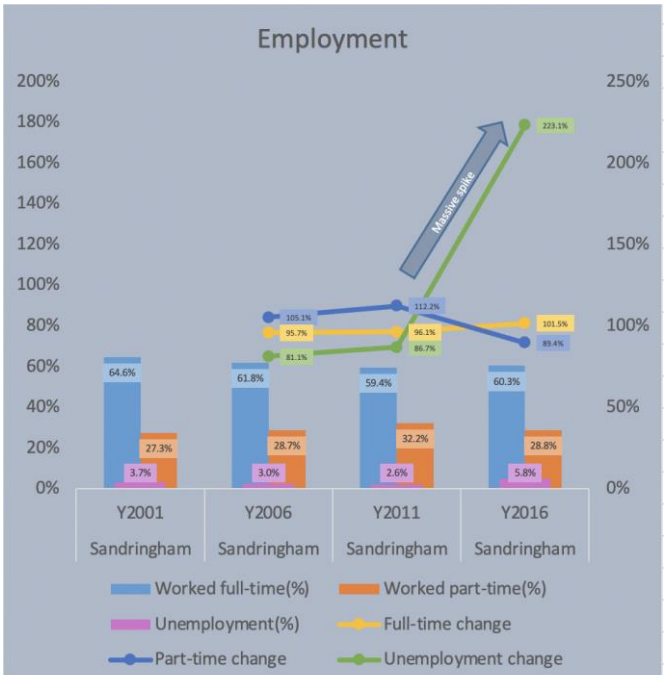

Figure 21 Employment chart

When numerous types of data measured on various scales need to be displayed in a single chart, combination charts are the best option. Here, we present information on the full-time, part-time, and unemployment rates for the category, as well as changes in each over time, from 2006 to 2021. A better comparison that highlights the difference was made by rescaling the vertical axis, which was then removed to make more room. Colour-formatted data labels, arrows with summary information, and symbols are incorporated for improved comprehension and visual impact.

Summary

The number of full-time employees in Sandringham decreased by 4.3% over the 20 years from 2001 to 2021. Except for the abrupt surge and decline in 2011, there was a consistent but slight 1.5% gain in part-time employment. Unemployment rate was decreasing slowly but steadily from the year 2001 to 2011, then unfortunately there was a suddenly rise of unemployment rate in years between 2011 to 2016. Compare to 2011 there was nearly 137% rise in unemployment rate in 2016. The employment market exhibits a region's economic expansion. We can

comprehend the economy and, in turn, the affordability and demand for housing market by evaluating the employment position of the people.

Visualisation 7. Dwelling:

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham	
Time	Y2001	Y2006	Y2011	Y2016	Y2021	
OccupiedDwellings(%)	84.2%	86.9%	90.3%	89.7%	93.7%	
UnoccupiedDwelling(%)	15.8%	13.1%	9.7%	10.3%	6.7%	
SeparateHouse(dwellings%)	48.3%	69.1%	74.2%	62.2%	63.5%	
SemiDetached(dwellings%)	6.1%	13.8%	6.0%	8.6%	8.1%	
FlatUnitApartment(dwellings%	45.0%	17.1%	18.8%	29.2%	27.8%	
OccupiedDwellings Change	100.0%	103.2%	103.9%	99.3%	104.5%	
UnoccupiedDwelling Change	100.0%	82.9%	74.0%	106.2%	65.0%	
SeparateHouse Change	100.0%	143.1%	107.4%	83.8%	102.1%	
SemiDetached Change	100.0%	226.2%	43.5%	143.3%	94.2%	
FlatUnitApartment Change	100.0%	38.0%	109.9%	155.3%	95.2%	

Figure 22 Dwelling data

Visualisation Technique (Figure 23)

When several types of data need to be displayed in a single chart, combination charts are the best choice. Here, we have information on two categories: housing type, which has three variables (separate, semi-detached, and flat, units, apartments), and occupancy, which has two variables (occupied and unoccupied). Consequently, a combination chart with clustered columns for occupancy with two factors and lines for the kind of dwellings with three variables. For easier comparison and better emphasis of the difference, the vertical axes have been rescaled. To provide a clear and appealing visual experience, the grid lines were first removed. For more visual impact, data labels with label and text formatting in different colours and fonts are offered.

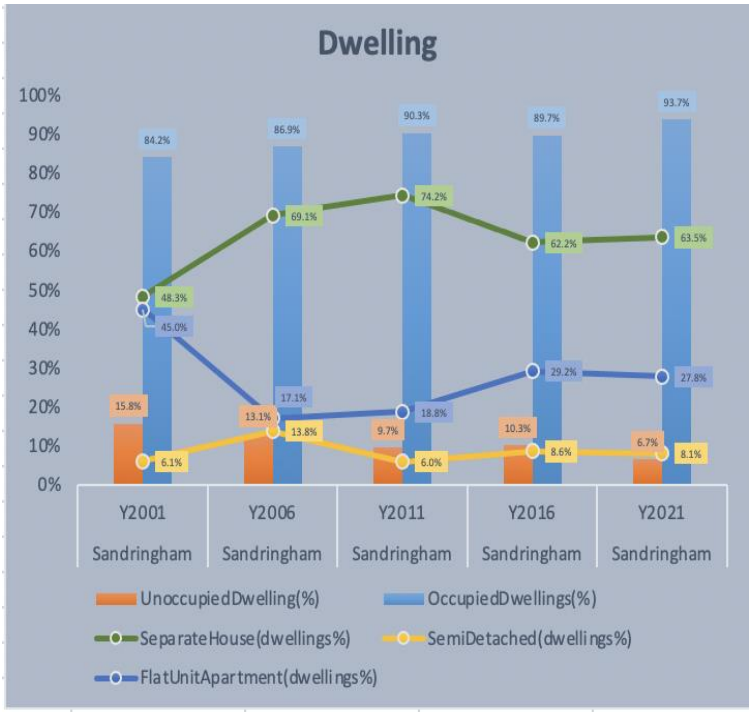

Figure 23 Dwelling chart

Summary

The number of occupied dwellings has steadily increased throughout the 20 years, from 2001 to 2021, while the number of unoccupied homes has decreased. This data confirms the earlier observation that supply is insufficient to meet demand. Semi-detached homes, units, flats, and apartments are now less popular housing options where separate houses are favoured. In the decade from 2001 to 2011, there was a 25.9% increase in separate residences, followed by a 12% decline. On the other side, the number of semi-detached homes climbed by 7% between 2001 and 2006 before steadily declining by another 5% during the subsequent 15 years, from

2006 to 2021. In Sandringham, flats, units, and apartments gradually lost popularity as homes, falling 28% in the first five years from 2001 to 2006 and then rising continuously by 10% during the next 15 years.

Visualisation 8. Family:

Location	Sandringham	Sandringham	Sandringham	Sandringham	Sandringham
Time	Y2001	Y2006	Y2011	Y2016	Y2021
Families	309	347	281	343	349
CoupleFamilyNoChidren(%)	45.3%	40.9%	41.1%	40.5%	39.8%
CoupleFamilyHasChidren(%)	39.2%	46.4%	46.1%	46.0%	47.6%
OneParentFamily(%)	12.3%	10.4%	10.7%	12.3%	12.0%
OtherFamily(%)	3.2%	2.3%	2.1%	1.2%	0.9%
CoupleFamilyNoChidren Change	100.0%	90.3%	100.5%	98.5%	98.3%
CoupleFamilyHasChidren Change	100.0%	118.4%	99.4%	99.8%	103.5%
OneParentFamily Change	100.0%	84.6%	102.9%	115.0%	97.6%
OtherFamily Change	100.0%	71.9%	91.3%	57.1%	75.0%

Figure 24 Family Data

Visualisation Technique (Figure 25)

When a single chart must display many types of information measured on various scales, combination charts are the best option. Here, we have information on families in terms of numbers as well as four factors, including percentages for couples without children, couples with children, one-parent families, and other types of families. Consequently, a combination chart with cluster columns for the four variables and line for the families' numbers is needed. For easier comparison and better emphasis of the difference, the vertical axes have been rescaled. Colour-formatted data labels and a legend are offered for improved comprehension and visual impact. The chart section has a colour format as well.

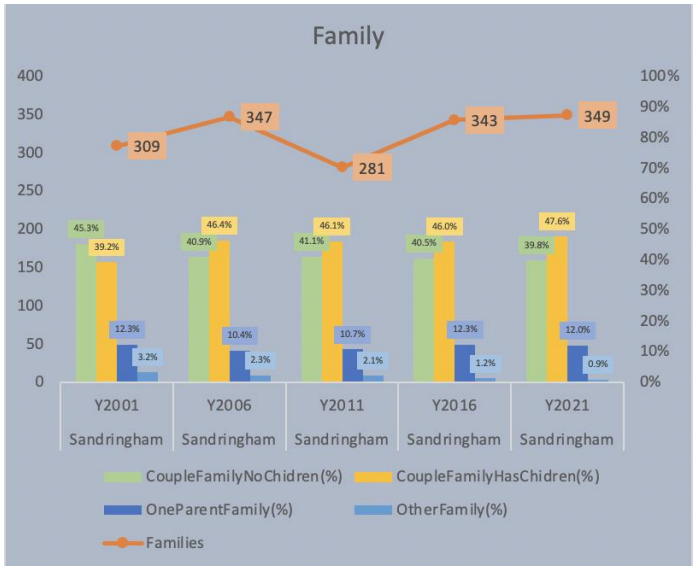

Figure 25 Family chart

Summary

With the exception of a sharp decline in 2011, the number of families increased steadily. Couples with children are growing, while those without children are declining. It's interesting to note that throughout time, couples with children continuously expand by 8.4% while couples without children decline by 5.5%. The percentage of one-parent families remained constant at 12% between 2001 and 2021, dropping by 0.3%. By 2021, the population of other families was the smallest of all the family kinds. Initially comprising just 3% of the family, this variety currently makes up less than 1% as of 2021. In general, detached or semi-detached homes are preferred by families with children over flats and apartments. Families with children prefer to buy homes over apartments. Families with children naturally prefer to reside in the suburbs rather than the CBD, where the majority of homes are flats or apartments. A couple with children prioritises schools, parks, and other amenities above a couple without children who would prefer a suburb with a nightlife, an easy commute, and a gym.

Visual Analytics. Summarise and conclusion:

This study seeks to demonstrate the visualisation techniques used to analyse and present fascinating trends of Sandringham dataset from the Australia Bureau of Statistics (ABS). The dataset is broken down into 7 categories, where visualisation methods are used. It includes an explanation of the trends found, a description of the data sample, and an assessment of the various visualisation approaches employed.

Many other methods were used, including combo charts, clustered bar charts, clustered column charts, stacked line charts, and line charts. To determine which visualisation is the most effective and appropriate for various types of data information, each approach was contrasted and assessed against one another. When the data had the same value format, a stacked line chart or line chart is frequently used as it works best when used to demonstrate long-term relationships and patterns. The various lines on the graph, however, might make it cluttered and challenging to read when there are a lot of variables. Clustered column charts, on the other hand, are employed throughout this report, either alone or in conjunction with other techniques to make a Combo chart. When there are several categories to compare, the Clustered chart gets cluttered, making it harder to see trends. As a result, some bar charts use the swapping rows/columns approach to enable for better trend monitoring.

Finally, when a dataset has various scales, metrics, or data types, a combo chart is utilised. By combining two visualisation approaches into a single graph, it makes it possible to link and make sense of trends from various measures without having to construct two separate charts. However, it can become difficult to use, and the resultant chart may not make sense or be difficult to interpret. Therefore, choosing data and chart types carefully is necessary to tell a compelling tale.