# Datathon submission

Hit'n'Run

We have identified four clusters of 'typical hubs', each featuring different sets of characteristics. They also represent four stages in the lifecycle of a community hub.

① YOUNG BEES

'Young Bees' hubs have small number of programs and activities offered, and not many participant attendance. The average hub age of this cluster is about one year, and they have just started their journey.

Cluster size — **20%**

Year in operation

Number of volunteers

Number of program/activity

Number of participants
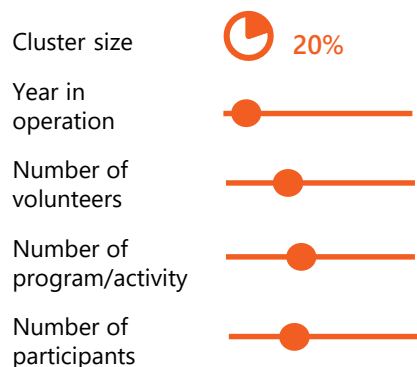
TOP PROGRAMS IN 2019
- **Playgroups and Early Years**
- Parent Engagement
- English Classes & Conversation

② MATURING HIVES

Hubs in the Maturing Hives cluster have grown significantly since stage 1, running a significant number of program and attracting many participations. Their relatively low number of volunteers indicate that they're still building strong connection with the community.
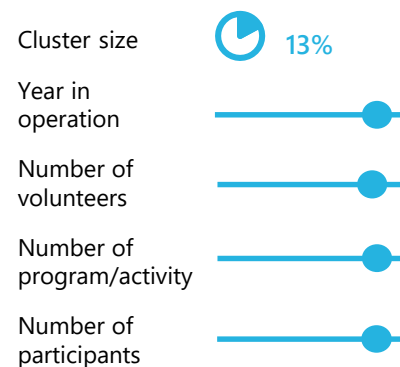
Cluster size — **62%**

Year in operation

Number of volunteers

Number of program/activity

Number of participants
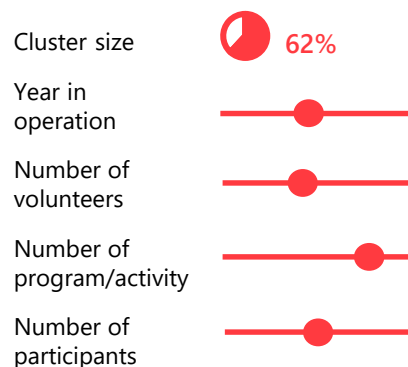
TOP PROGRAMS IN 2019
- **Parent Engagement**
- English Classes & Conversation
- Healthy Lifestyle

③ BEE-TOPIA

Bee-topia hubs are the ones that have operated the longest, offered the most number of programs, attracted the most number of participants, and cultivated the strongest relationship with the community.

Cluster size — **13%**

Year in operation

Number of volunteers

Number of program/activity

Number of participants

TOP PROGRAMS IN 2019
- **Healthy lifestyle**
- Parent Engagement
- English Classes and Conversation

Ⓧ EXTINCT

Only 1% of community hubs had cease its operation. Despite a decent connection with the community, as indicated by the number of volunteers, they are relatively inactive, running very few programs and hence attracting very few participants.

Cluster size — **1%**

Year in operation

Number of volunteers

Number of program/activity

Number of participants
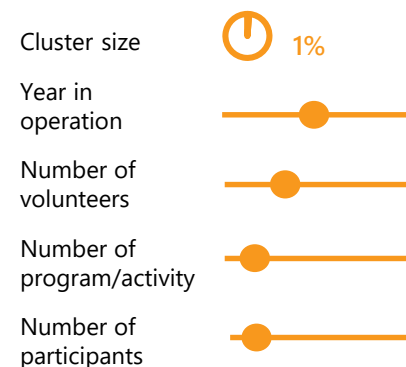
TOP PROGRAMS IN 2019
- **English Classes & Conversation**

See Appendix, page 5-7 for relevant data visualisation.

Key legend: Low — High

Despite four clusters, we have observed five facts that are common to all hubs. This will paint a full picture to help Community Hub determine whether a deviation from 'typical' is good, neutral or concerning.

Hubs with large annual participant growth tends to also have significant annual volunteer growth.

What does this tell us?

The channels of communication used by these hubs may be more effective in reaching more participants and volunteers. It may be worth examining the communication practices of these hubs to understand their growth, so it can be implemented in other hubs too.

See Appendix, page 9 for relevant data visualisation.

Referral participants are declining in most hubs and contribute least to total participants growth.

What does this tell us?

Referrals are a less effective way of getting new participants than other channels. If this channel has been effective in the past it may be worth emphasising or reiterating the option of referrals to current participants to enliven this stream of participant growth.

See Appendix, page 13 for relevant data visualisation.

Adult participation is largely driven by activity and program, but child participation is largely driven by session time.

What does this tell us?

Adults appear to attend activities out of own interest, whereas kids are often taken to attend an activity at a time that works best for adults. Hubs should understand the participation patterns and schedule programs accordingly to maximise attendance and influence.

See Appendix, page 12 for relevant data visualisation.

A typical hub is expected to see the most children on Wednesdays throughout the year and the least on Fridays in term 1 and 2.

What does this tell us?

Even though Wednesdays are the most popular day for children participants across all hubs, each hub should analyse its own participation rates to better understand which days it should offer relevant activities, given there clearly is a pattern of preferences.

See Appendix, page 10 for relevant data visualisation.

4. Average adult participation is consistent throughout the year and peaks on Fridays in term 4.

What does this tell us?

Adult participation being consistent throughout the year shows that school terms are not a determining factor to participation, except in term 4, when Fridays appear to be more popular than during other terms. Community Hub could consider providing an increased number of activities at this time if hubs are also noting the increase.
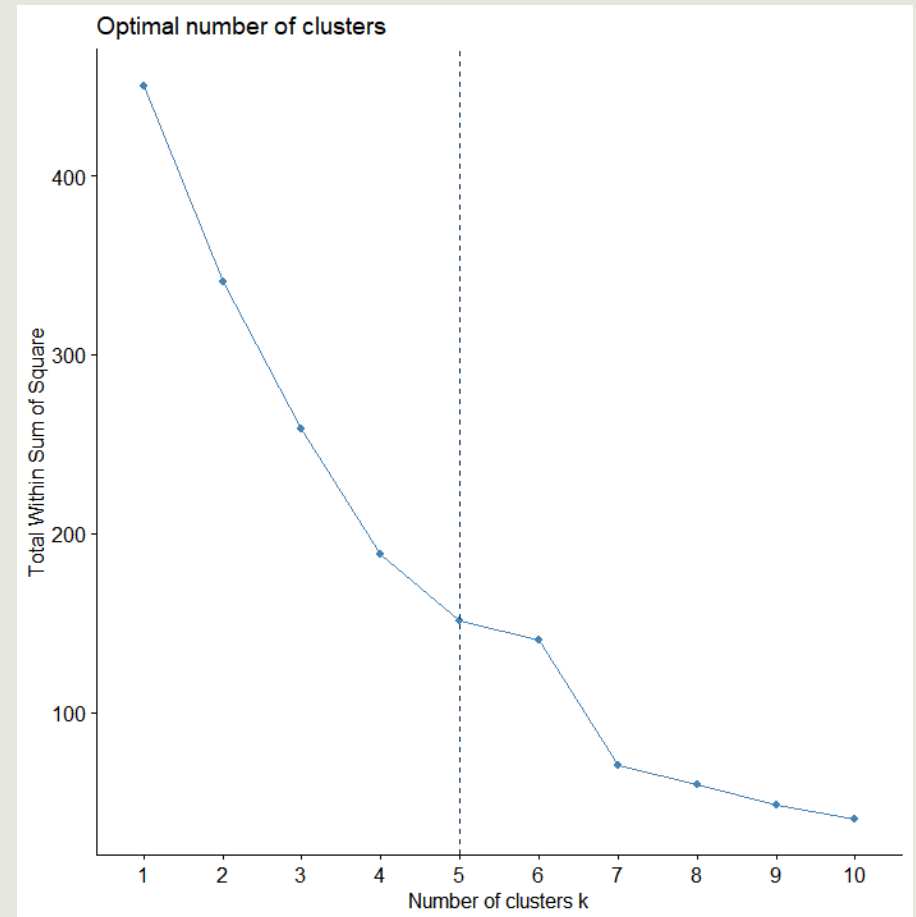
See Appendix, page 11 for relevant data visualisation.

Appendix

K-means cluster analysis using a subset of hub features indicate the optimal number of clusters is between three to five. We have chosen to group hubs into 4 clusters.
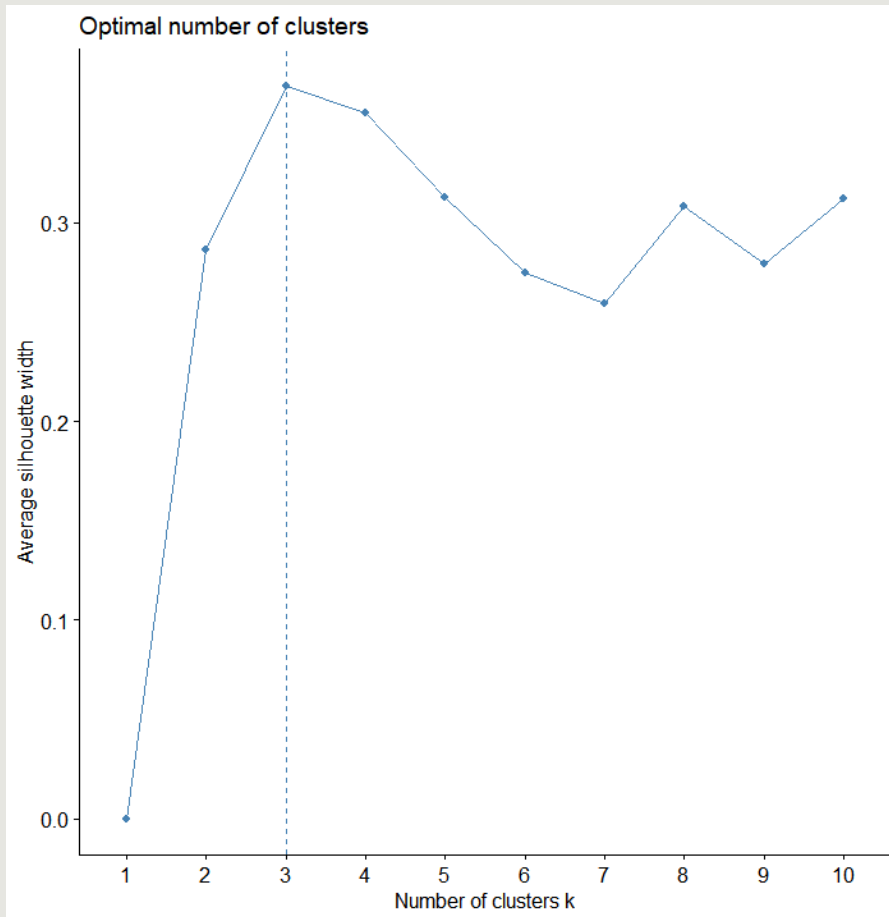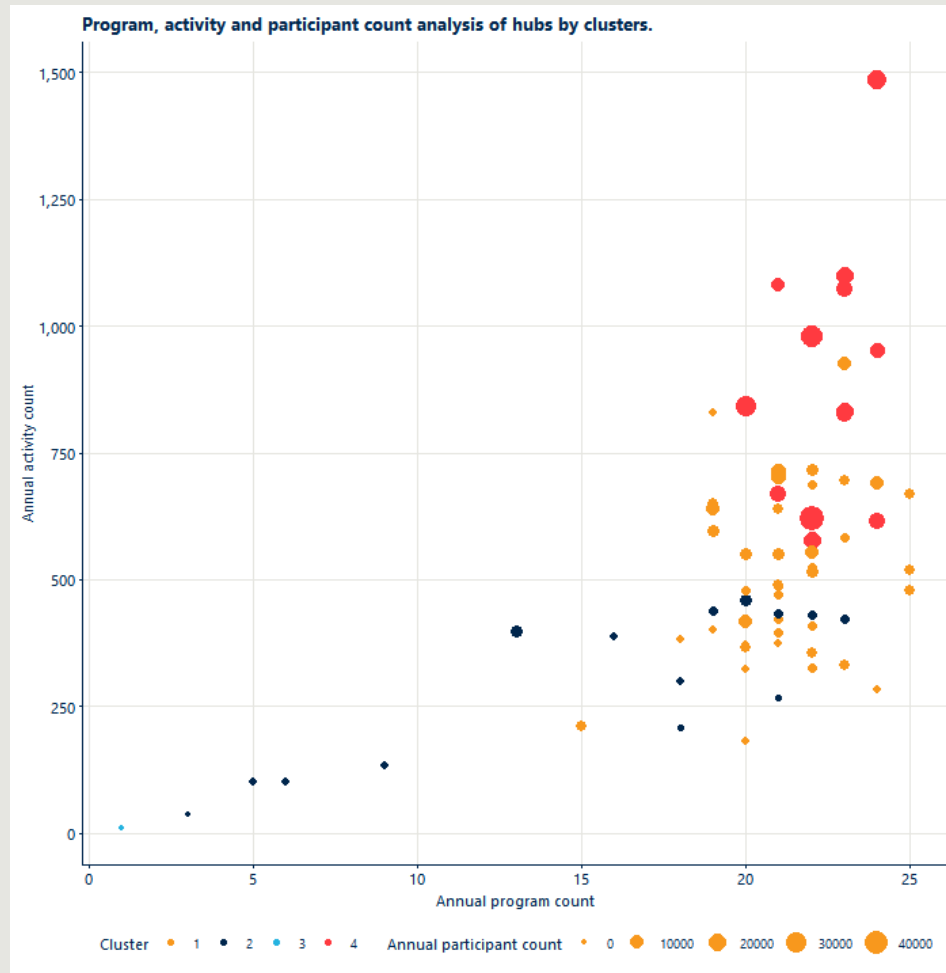

Silhouette method

Elbow method

Each cluster has a different program focus.

Program, activity and participant count analysis of hubs by clusters.

| Cluster	Top three programs in 2019	Total annual activity count
1	**Parent Engagement**	**2,701**
	English Classes & Conversation	2,449
	Healthy Lifestyle	1,848
2	**Playgroups and Early Years**	**705**
	Parent Engagement	425
	English Classes & Conversation	391
3	**English Classes & Conversation**	**10**
	-	-
	-	-
4	**Healthy Lifestyle**	**2,043**
	Parent Engagement	1,383
	English Classes & Conversation	810

Over 50% of all hubs are maturing hubs with diverse programs but relatively low activity, participant and volunteer count.

| Clusters	n	Annual program count	Annual activity count	Annual participant count	Annual volunteer count	Status of hub (active or inactive)	Years in operation
1	47	0.27	-0.03	-0.29	-0.15	0.11	0.29
2	15	-1.06	-0.96	-0.56	-0.23	0.11	-1.6
3	1	-3.81	-1.98	-0.83	-0.27	-0.83	0.37
4	13	0.53	1.36	1.75	0.82	0.11	0.78

Cluster plot
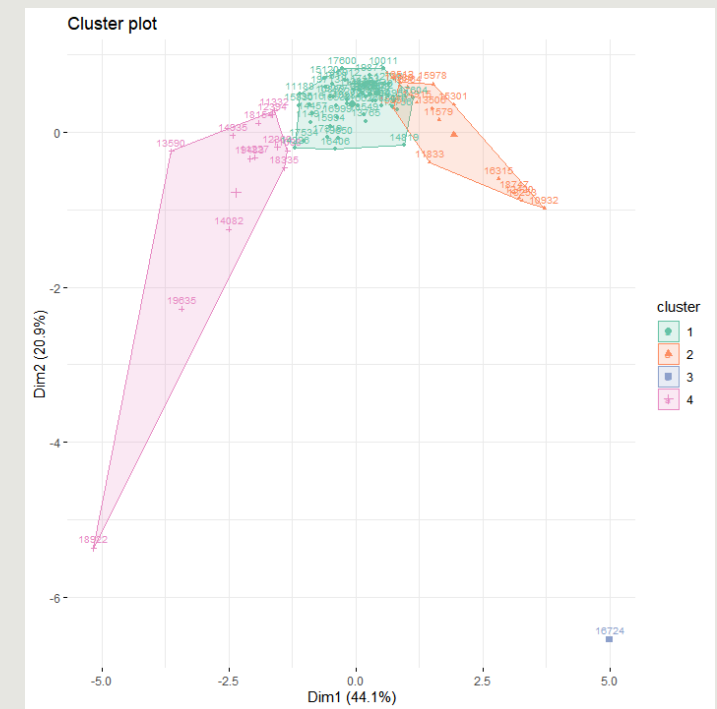
Four clusters was used in the cluster analysis. Note that values for all features are scaled using principal component analysis. Clustering was done on 2019 dataset.

The five fastest growing hubs grew between 15-85% in terms of annual participant count from 2016-2019.
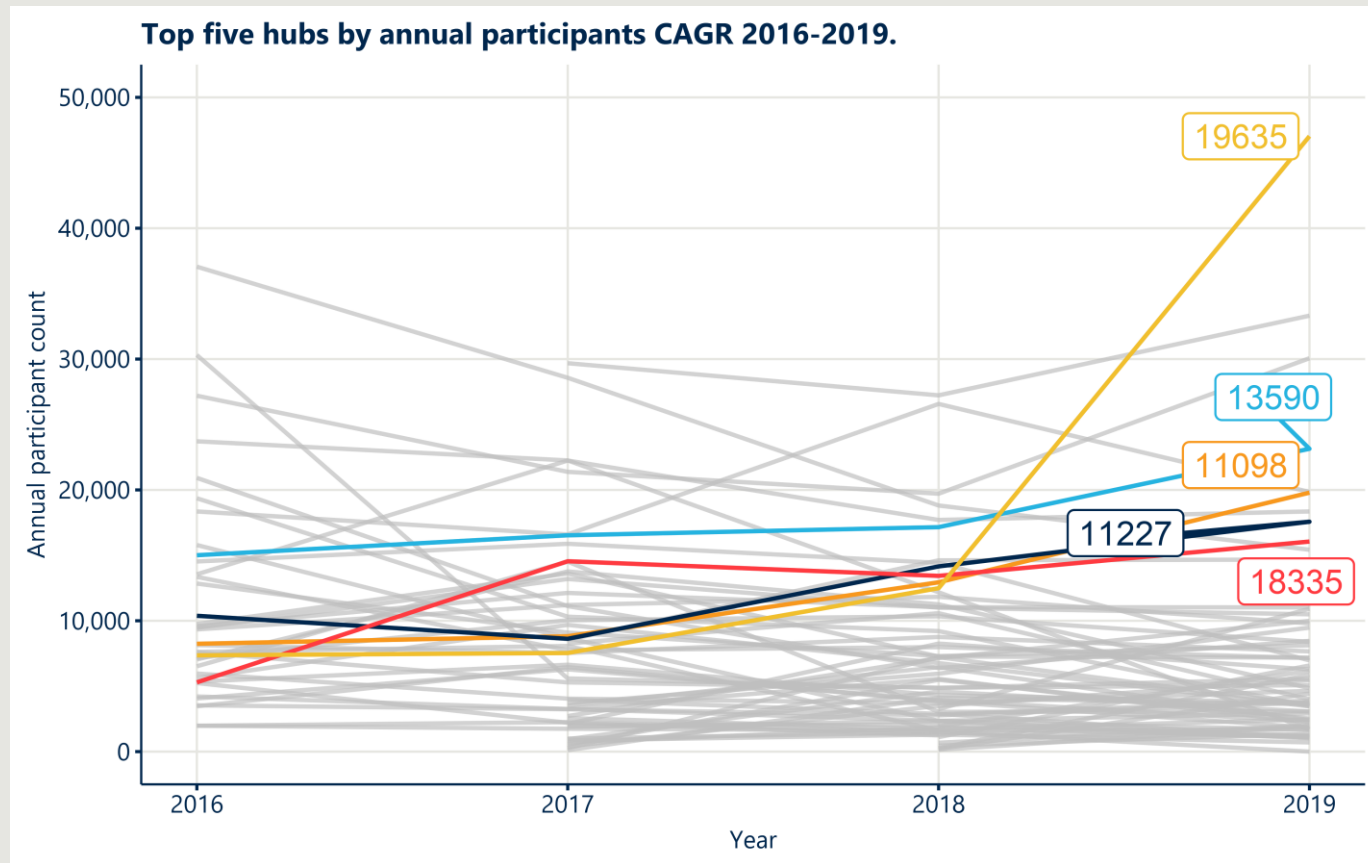
Top five hubs by annual participants CAGR 2016-2019.

Hubs with large annual participant growth tends to also have significant annual volunteer growth.

Top five hubs by annual volunteers CAGR 2016-2019.
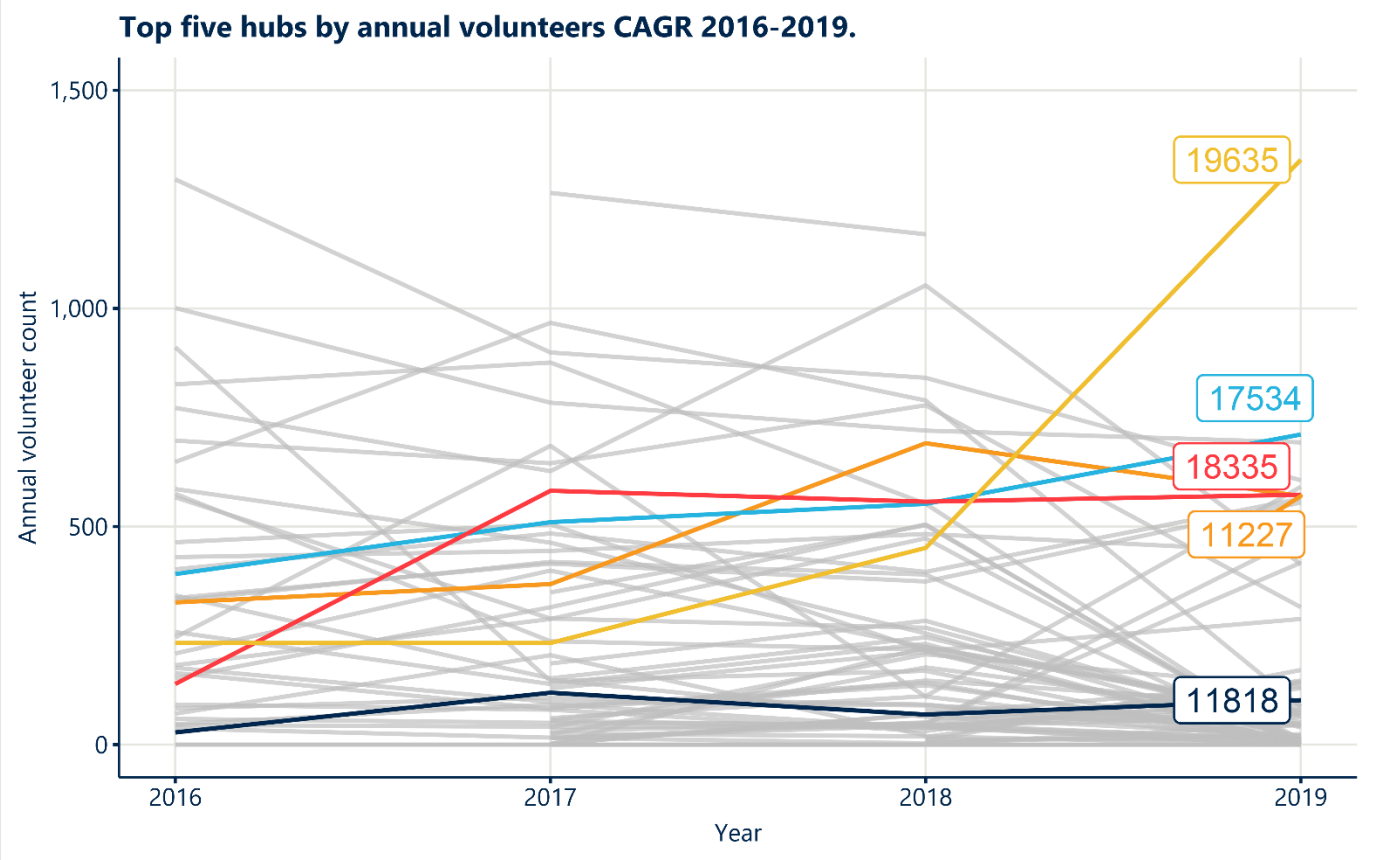
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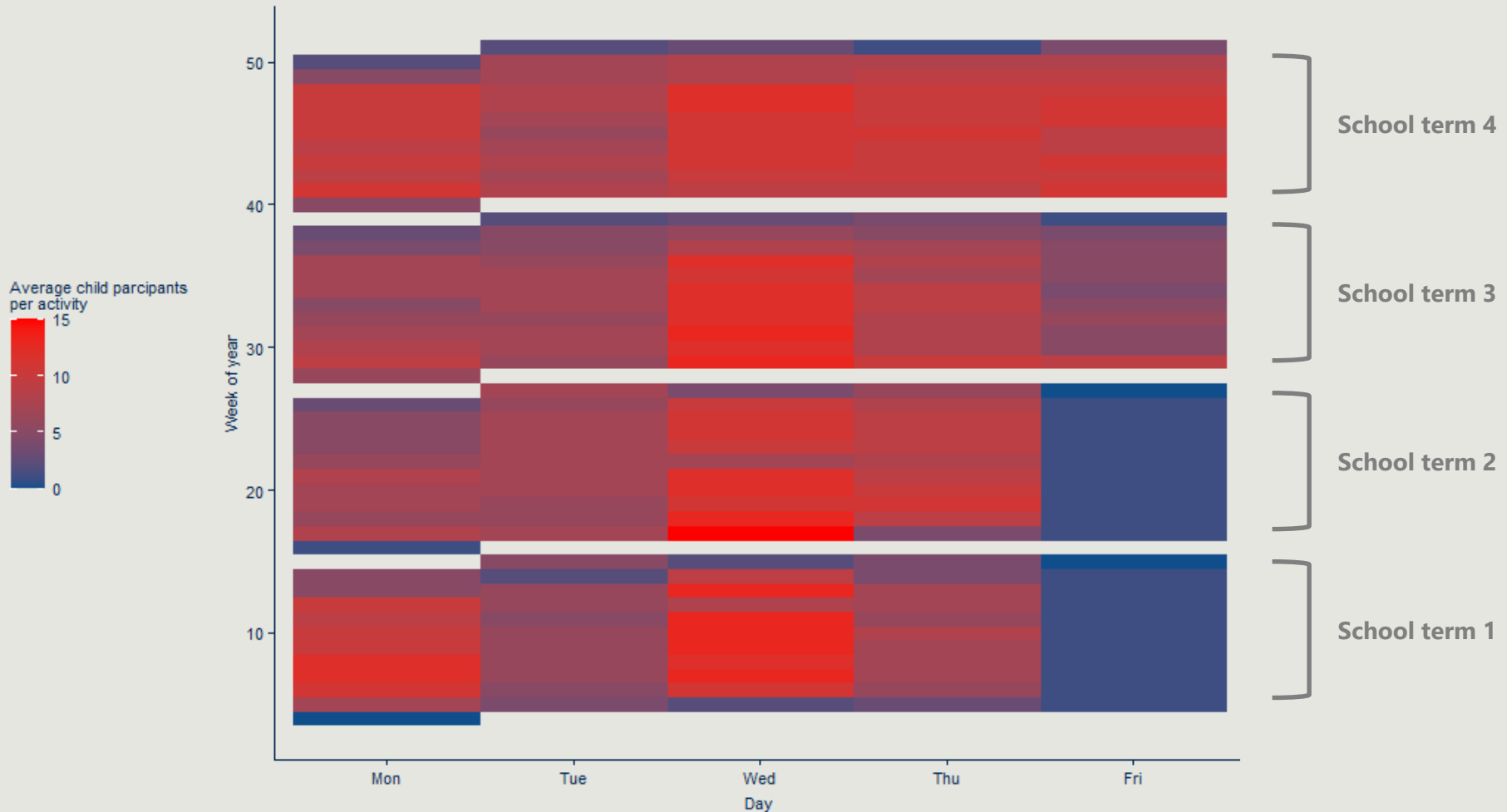
Average adult participation is consistent throughout the year and peaks on Fridays in term 4.
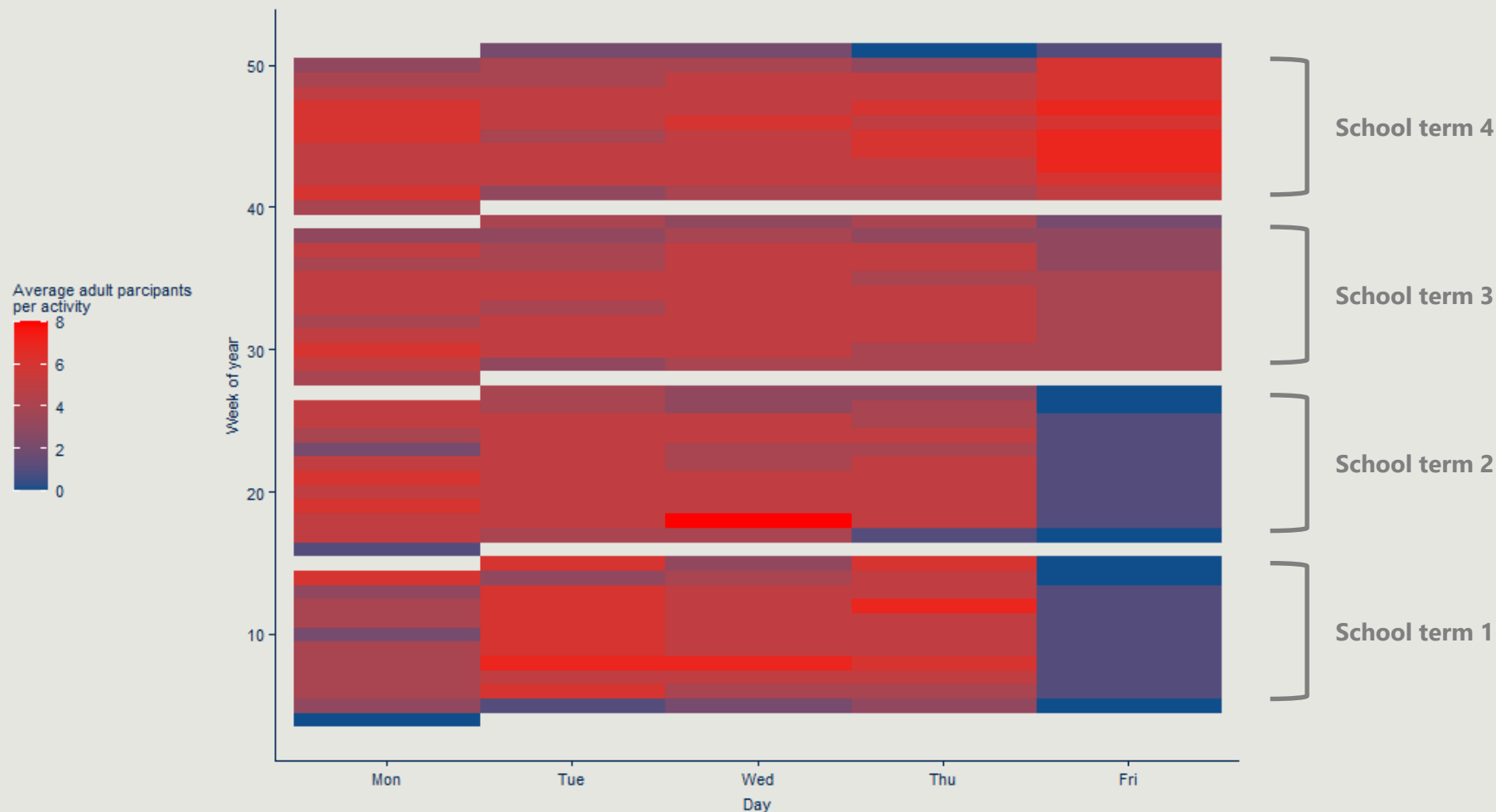
We see very different sets of drivers for adult and child participation.

We conduct regression analysis to investigate what relationship between activity and participation can be observed in a typical hub. Results below show that adult attendance is largely driven by activity and program. On the other hand, activity time is the main driver for child participation.

Top drivers of adult participation

Rank	Driver	
1	Activity	Formal training
2	Activity	English classes and conversation programs
3	Activity	Parent engagement
4	Activity	Informal training
5	Activity	Playgroups and early years
6	Starting hour	6 pm
7	School term	4
8	Activity	Healthy lifestyle programs

Top drivers of child participation

Rank	Driver	
1	Starting hour	7 am
2	Activity	Healthy lifestyle programs
3	Starting hour	8 am
4	School term	4
5	Activity	Children's language and literacy programs
6	School term	3
7	Day of week	Monday
8	School term	2

Referral participants are declining in most hubs and contribute least to total participants growth

Three-year CAGR of annual participant count by participant segments and hubs.

Top five hubs by annual referral participants CAGR 2016-2019.