Impact of Onboarding Speed in E-commerce on Long-term Success

Task: To investigate whether environments that complete the onboarding process 'very fast' achieve higher revenue results compared to those with a longer onboarding process.

This analysis is conducted to investigate how quickly environments complete onboarding actions after registration (e.g., connecting a store, adding a product, creating a template, placing 1 manual order, obtaining 1, 2, 5+ integration orders, and others). The current analysis employs the logic of assigning environments into groups based on the onboarding process duration and explores the impact of onboarding process duration on revenue performance over the long-term period.

Hypotheses to test this task:

Hypothesis 1: Average Monthly Revenue

Null Hypothesis (H0): The average monthly revenue for the 'very fast' group is significantly higher than that for the 'fast' and 'slow' onboarding groups over the long term.
Alternative Hypothesis (H1): The average monthly revenue does not differ significantly among the 'very fast,' 'fast,' and 'slow' onboarding groups over the long term.
Metrics to check the hypothesis: Average Monthly Revenue, Average Monthly Revenue Growth Rate.

Hypothesis 2: Revenue Trends

Null Hypothesis (H0): Distinct revenue trends exist among selling regions and types of registration origins within the 'very fast' group, exhibiting significantly better results than the 'fast' and 'slow' groups.
Alternative Hypothesis (H1): The direction of trends among selling regions and registration origins is similar within each of the onboarding groups.
Metrics to check the hypothesis: Average Monthly Revenue on a low level of granularity (Onboarding group - Registration origin - Selling region).

Hypothesis 3: Revenue Volatility

Null Hypothesis (H0): Monthly revenue for the 'very fast' onboarding group experiences less fluctuation (has lower revenue volatility) than the 'fast' and 'slow' groups over the long term.
Alternative Hypothesis (H1): Revenue volatility remains consistent among 'very fast,' 'fast,' and 'slow' customer groups over the long term.
Metrics to check the hypothesis: Average Volatility, Absolute Average Volatility, Standard Deviation, Coefficient of Variation.

Hypothesis 4: Cumulative Revenue

Null Hypothesis (H0): Significant differences exist in cumulative revenue over time among the 'very fast,' 'fast,' and 'slow' customer groups, with the 'very fast' group demonstrating superior results.
Alternative Hypothesis (H1): Cumulative revenue over time is similar among the 'very fast,' 'fast,' and 'slow' groups.
Metrics to check the hypothesis: Average Cumulative Revenue, Average Cumulative Revenue Growth Rate.

Note: Hypothesis 1, and Hypothesis 2 are additionally accompanied by the two methods to calculate average monthly revenue.

Data Considerations/Limitations

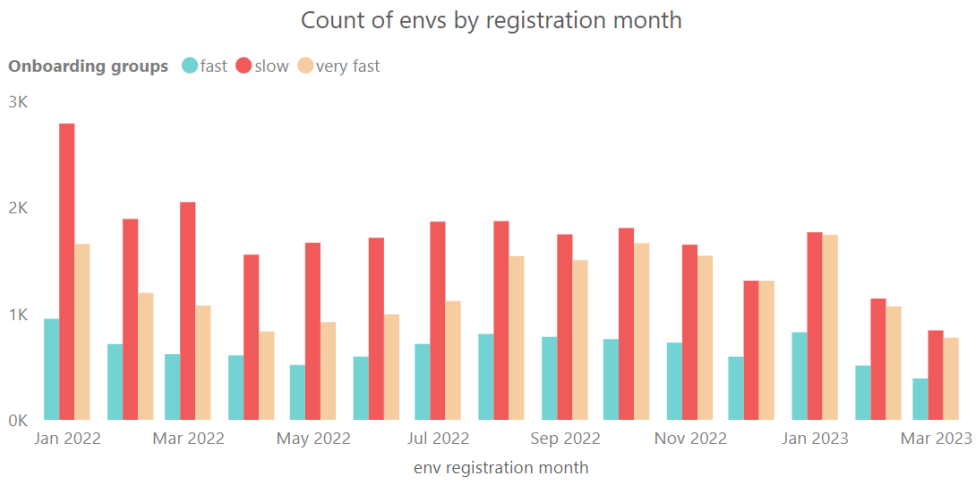
For the analysis, we focus on **environments within one segment, have** completed the onboarding process (not during the peak period), and have at least 1 non-sample order at any time after registration

The **onboarding process** involves three actions: store creation, product template creation, and pushing the prepared products to their store.

The duration of the onboarding process is calculated as the time in hours between environment registration and the time of the last of the three actions (first store creation, first product template creation, and first pushing the prepared products to their store), as they might be conducted not in strict order.

Based on the duration of the onboarding process, each environment is assigned to one of the groups:

- Very fast (< 24 hours)
- Fast (< 7 days)
- Slow (>= 7 days)



The criteria for selecting 'Very fast < 24' were chosen to ensure a more normalized distribution by the number of registered environments. Otherwise, if using a threshold of < 48, the number of environments in the 'fast' group would be considerably lower than in the other groups.

To **standardize data**, two steps were taken:

- *Excluded Peak Months*: Revenue data from October to December in both years were excluded, but registrations during these months were included.
- *Excluded Environment Outliers*: Monthly Revenue Criteria. This step ensures a smoother analysis, revealing established trends rather than being distorted by outlier results.
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The **main revenue metric** is the average monthly revenue in USD, calculated by two methods:

- *Method 1*: The calculation involves adding the revenue across all environments in a specific month and dividing it by the number of environments in that month.
- *Method 2*: The first step involves calculating the average revenue per environment across all months, considering the one currently under review. For instance, the average revenue in the 13th month is determined by calculating the average revenue from the 6th to the 13th month. The second step is to calculate the average revenue for the group based on the observed average revenue per environment.

A **long-term period** is considered as the period starting 6 months from registration (the month of registration is not counted), with the base period being the 6th month since registration.

A selling region is the latest one that was set up by an environment. It's crucial to consider that concluding based solely on selling regions might be somewhat biased, as an environment might change a default selling region during its lifetime. In the analysis, in addition to the existing selling region 'Europe,' all European countries are included.

Results may become more biased toward the end of the observed period (months since registrations) as fewer environments have data. The number of environments that have the 9th month since registration is higher than the number of environments that have the 19th month since registration. The amount of observation data decreases as the analysis moves towards later months as fewer environments have sales data.

Summary

Null hypotheses have been formulated to establish that the 'very fast' onboarding group outperforms others in various revenue metrics (average revenue at both high and low levels of granularity, cumulative average revenue, and reduced fluctuations in monthly revenue). In contrast, alternative hypotheses emphasize that there are no differences in revenue metrics across groups or/and the 'very fast' group does not demonstrate sustained success over the long-term period.

- *The 'very fast' onboarding group did not demonstrate the highest monthly average revenue performance during the observed period; instead, it exhibited the lowest average revenue compared to the other groups. The Null Hypothesis within 'Hypothesis on Average Monthly Revenue' is rejected.*

- *The 'very fast' group did not show distinct firm revenue trends among all observed combinations of selling regions and types of registration origins. However, in 'Europe' for the 'very fast' group, there was evidence of an upward trend, but only in the latest months since registration. The Null Hypothesis within 'Hypothesis on Revenue Trends' is mostly rejected.*

- *The 'very fast' group exhibits the lowest results in volatility metrics and experiences the smallest range of fluctuations in monthly revenue compared to the 'fast' and 'slow' groups over the long-term period. The Null hypothesis within 'Hypothesis on Revenue Volatility' is proved.*

- *The 'very fast' group does not demonstrate the highest cumulative revenue. Instead, during the latter half of the observed period, the 'fast' group shows notably superior average cumulative revenue. Moreover, beyond the mid-point, the average cumulative growth rates remain relatively similar for the 'fast' and 'slow' groups, and surpass those of the 'very fast' group. The Null hypothesis within 'Hypothesis on Cumulative Revenue' is rejected.*

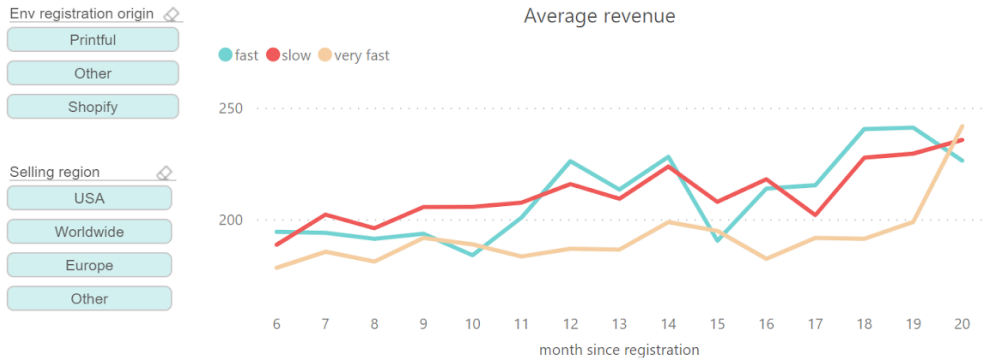
- Within outliers representing successful cases, there is no prerequisite for being 'very fast' or even 'fast.' Success within these outlier instances seems attainable without strictly adhering to rapid onboarding speeds.

Analysis

Hypothesis 1: Average Monthly Revenue

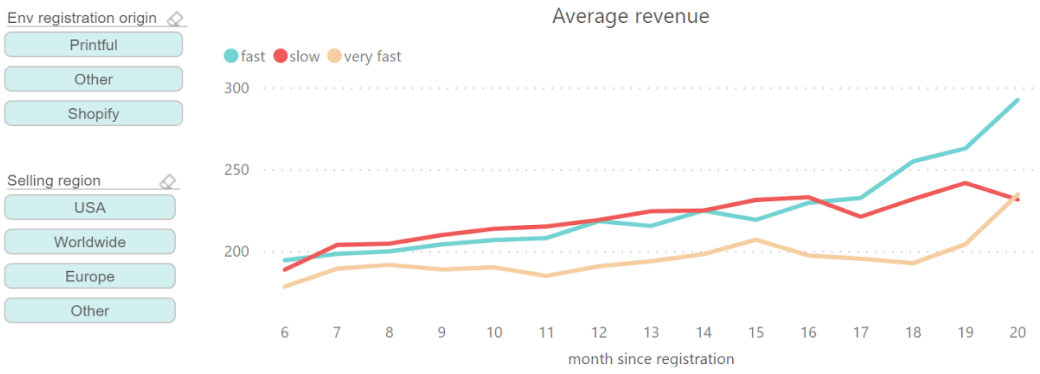
Null Hypothesis (H0): The average monthly revenue for the 'very fast' group is significantly higher than that for the 'fast' and 'slow' onboarding groups over the long term.
Alternative Hypothesis (H1): The average monthly revenue does not differ significantly among the 'very fast,' 'fast,' and 'slow' onboarding groups over the long term.
Metrics to check the hypothesis: Average Monthly Revenue, Average Monthly Revenue Growth Rate.

Hypothesis 1: Average Monthly Revenue
Method 1: Find the total revenue generated by a group in the current month, and then divide it by the number of environments within this group



month	fast	slow	very fast	Total
6	194.3	188.5	178.2	**185.9**
7	193.9	202.1	185.4	**194.4**
8	191.2	196.0	181.0	**189.7**
9	193.5	205.5	191.6	**198.3**
10	183.8	205.5	188.7	**195.8**
11	200.7	207.4	183.3	**198.2**
12	226.1	215.7	186.8	**208.7**
13	213.3	209.2	186.4	**203.0**
14	228.0	223.7	198.7	**217.0**
15	190.3	207.8	194.8	**200.9**
16	213.8	217.9	182.2	**206.7**
17	215.2	201.8	191.6	**201.3**
18	240.4	227.6	191.2	**218.8**
19	241.1	229.4	198.8	**221.3**
20	226.3	235.6	241.7	**235.7**
Total	**201.7**	**205.5**	**186.2**	**198.3**

Method 2: Find the average revenue per customer for months until the current, and then calculate the average within the group



month	fast	slow	very fast	Total
6	194.3	188.5	178.2	**185.9**
7	198.3	203.7	189.2	**197.4**
8	199.7	204.5	191.5	**198.9**
9	204.1	209.7	188.7	**201.2**
10	206.7	213.6	190.0	**204.3**
11	207.9	215.0	184.8	**203.7**
12	218.2	219.0	190.7	**210.1**
13	215.3	224.3	193.8	**213.4**
14	224.6	224.7	198.1	**216.8**
15	219.0	231.2	206.9	**221.9**
16	229.4	232.9	197.3	**221.8**
17	232.4	220.9	195.3	**215.6**
18	254.8	231.7	192.5	**223.9**
19	262.7	241.6	204.1	**232.9**
20	292.3	231.4	234.6	**243.4**
Total	**209.3**	**212.2**	**189.7**	**204.1**

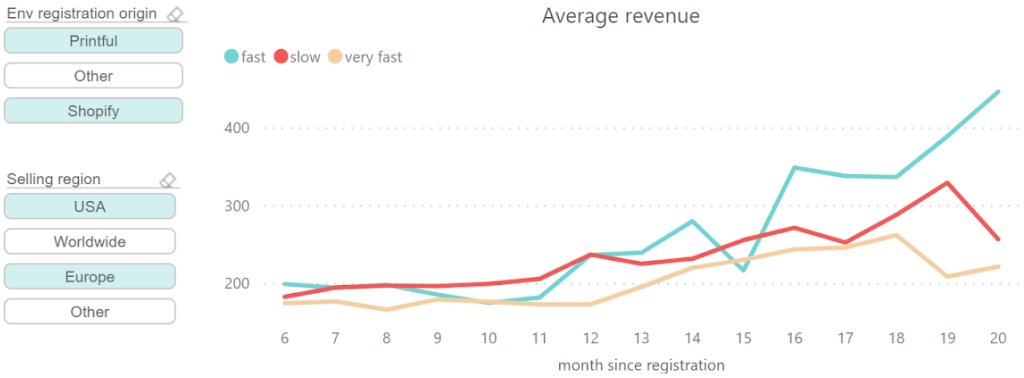
To check this hypothesis, there were implemented 2 methods to calculate the average revenue per group (described in the section ‘Data Considerations/Limitations’). Despite differences in values due to each method, the overall conclusion remains similar.

Considering all registration origins and selling regions, it is observed that the 'very fast' group consistently maintains the lowest average revenue among the 3 onboarding groups throughout the entire long-term observation period. The 'fast' and 'slow' groups exhibit similar trends.

Considering registration origins, like Printful, Shopify, and selling regions, like the USA, Europe, the overarching summary is that the 'very fast' group doesn’t have the highest average revenue over the long-term period. Starting from the 16th month, the 'fast' group experiences a significant increase in average revenue, while the 'slow' and 'very fast' groups show similar results below this rising trend.

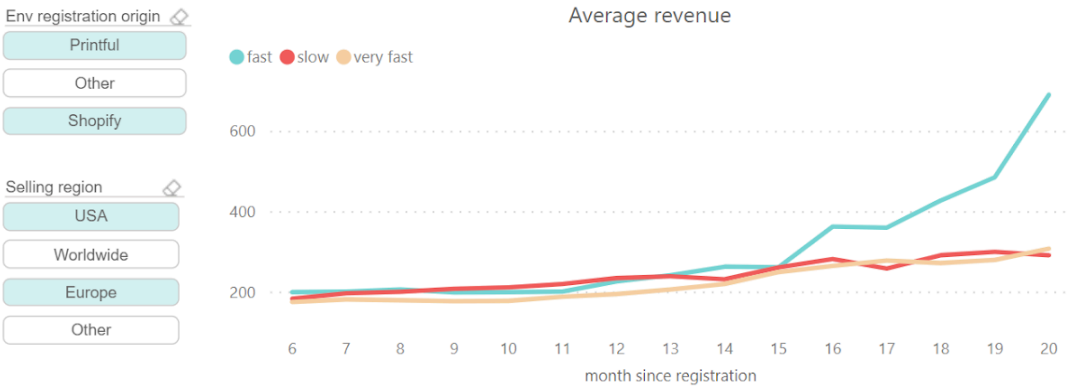
Hypothesis 1: Average Monthly Revenue

Method 1: Find the total revenue generated by a group in the current month, and then divide it by the number of environments within this group



month	fast	slow	very fast	Total
6	198.6	182.2	174.0	182.4
7	193.9	194.2	176.2	187.5
8	197.7	196.8	165.7	185.8
9	185.1	196.1	179.0	187.9
10	174.3	198.8	175.8	186.2
11	181.3	205.1	172.6	189.4
12	236.0	236.5	172.4	215.1
13	239.0	224.7	195.0	217.9
14	279.5	231.2	219.6	236.6
15	216.1	255.2	229.7	239.8
16	348.4	271.0	243.3	274.6
17	337.6	252.0	245.6	266.3
18	336.2	287.7	261.5	287.3
19	388.7	328.9	208.2	293.2
20	446.0	256.2	221.1	283.7
Total	**207.6**	**205.9**	**180.6**	**197.3**

Method 2: Find the average revenue per customer for months until the current, and then calculate the average within the group

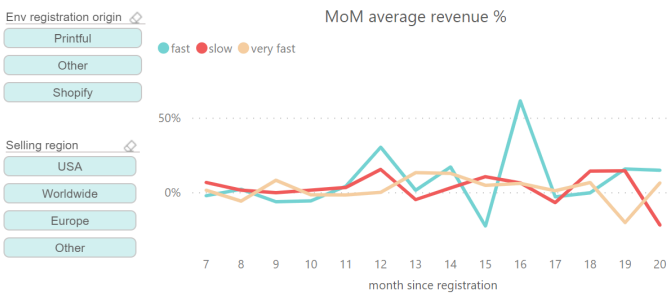


month	fast	slow	very fast	Total
6	198.6	182.2	174.0	182.4
7	200.0	195.5	180.7	191.0
8	205.3	199.4	178.5	193.1
9	197.9	207.0	176.1	194.2
10	198.6	210.4	177.0	196.5
11	199.9	219.0	187.1	204.4
12	225.3	233.6	193.8	218.8
13	240.8	238.0	205.3	228.1
14	262.1	230.6	219.0	232.9
15	260.8	260.4	248.5	256.7
16	361.7	281.1	263.9	288.9
17	359.1	257.4	277.2	284.4
18	426.9	290.7	271.1	308.8
19	484.5	298.9	278.8	325.8
20	690.1	290.5	306.9	379.2
Total	**217.1**	**210.8**	**187.9**	**203.9**

Month-over-month (MoM) average revenue growth rate, calculated using both methods and considering various registration origins and selling regions, shows increased fluctuations closer to the end of the observed period. However, no consistent directional trend toward a specific outcome is observed within each group throughout the rest of the period.

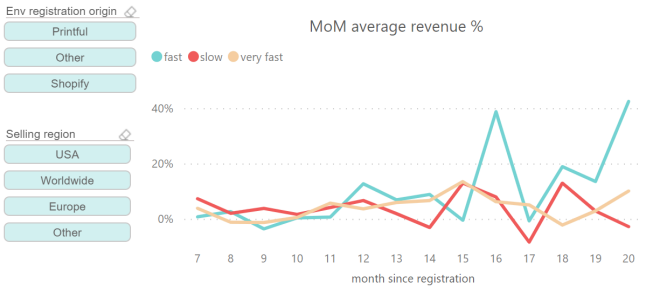
Hypothesis 1: Average Monthly Revenue

Method 1: Find the total revenue generated by a group in the current month, and then divide it by the number of environments



Hypothesis 1: Average Monthly Revenue

Method 2: Find the average revenue per customer for months until the current, and then calculate the average within the group



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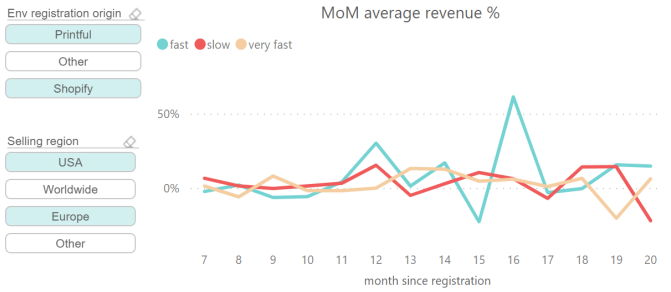
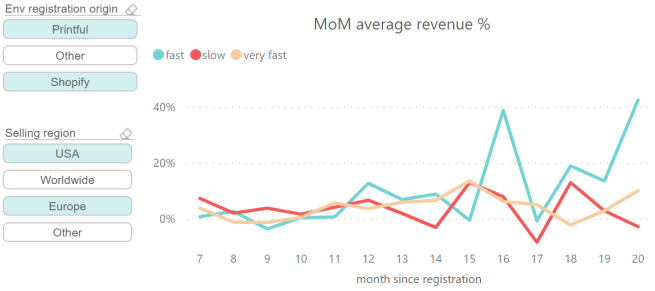


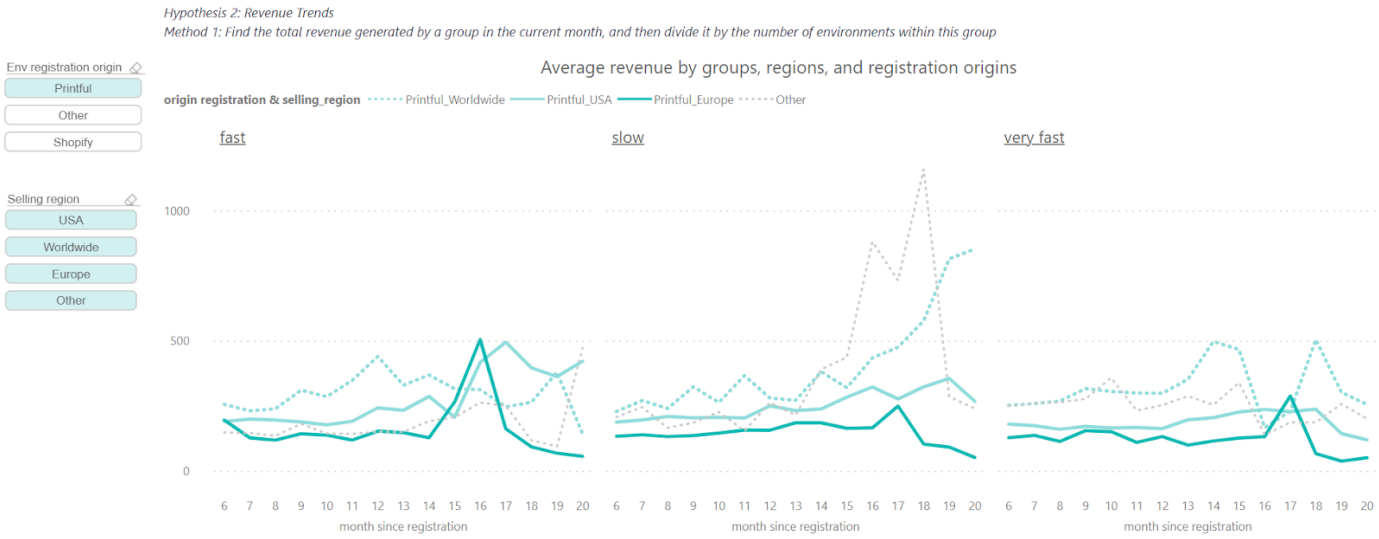
Method 2: Find the average revenue per customer for months until the current, and then calculate the average within the group

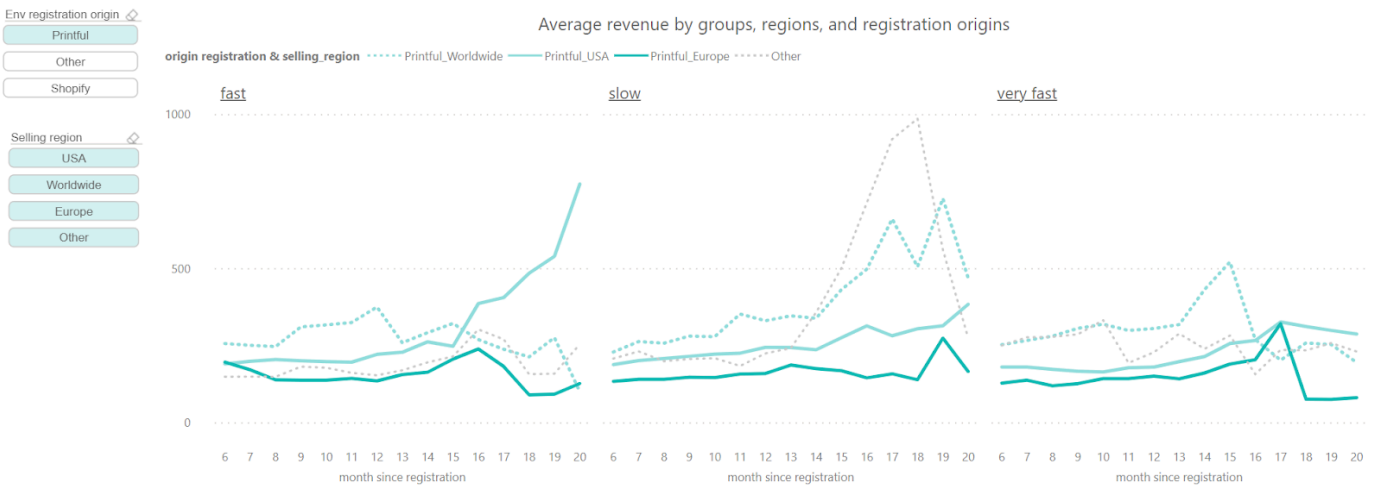


The Null Hypothesis within 'Hypothesis on Average Monthly Revenue' is rejected, as the 'very fast' onboarding group did not demonstrate the highest monthly average revenue performance during the observed period; instead, it exhibited the lowest average revenue compared to the other groups.

Hypothesis 2: Revenue Trends

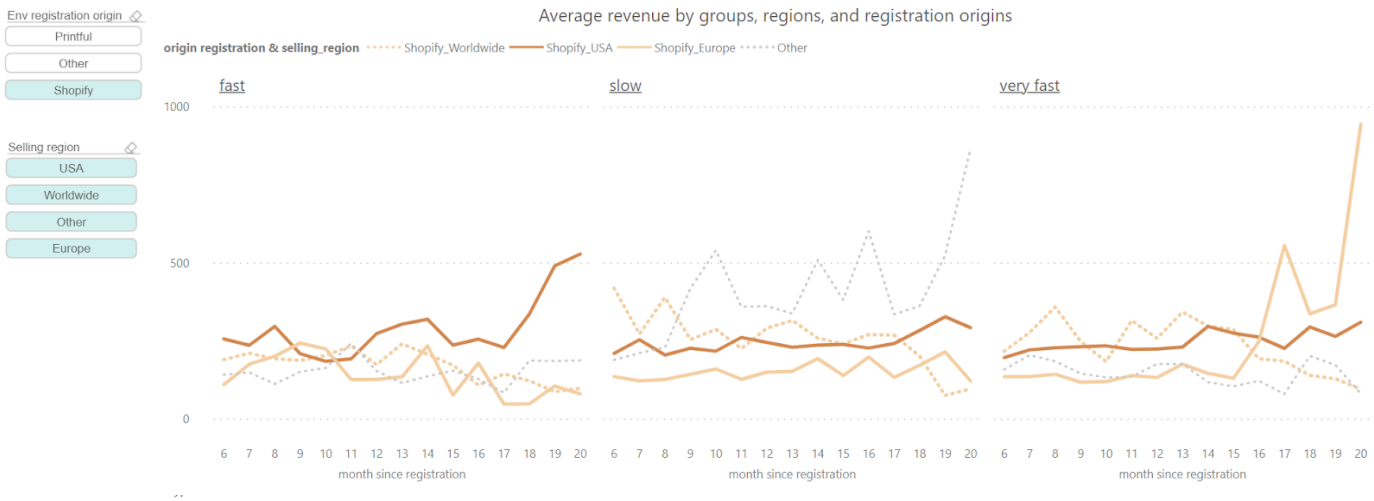
Null Hypothesis (H0): Distinct revenue trends exist among selling regions and types of registration origins within the 'very fast' group, exhibiting significantly better results than the 'fast' and 'slow' groups.
Alternative Hypothesis (H1): The direction of trends among selling regions and registration origins is similar within each of the onboarding groups.
Metrics to check the hypothesis: Average Monthly Revenue on a low level of granularity (Onboarding group - Registration origin - Selling region).



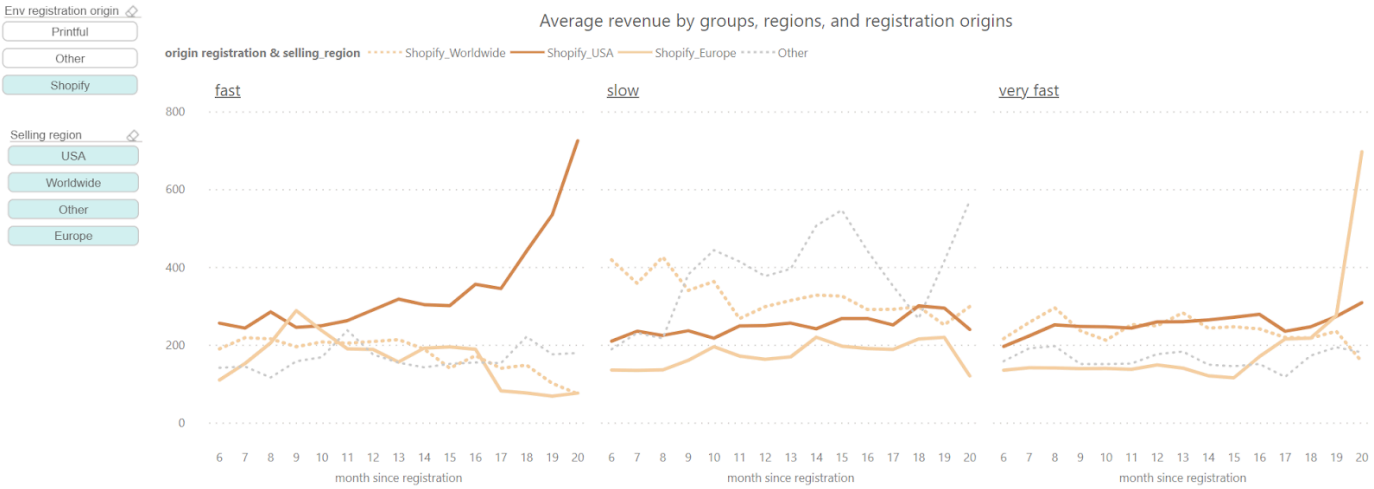


Across registrations originating from Printful, due to method 1, the highest results within 3 onboarding groups, and 4 different selling regions are observed only across some months in the 'slow' group for selling regions ‘Worldwide’, and ‘Other’. When employing method 2, in addition to the ongoing trends for the 'slow' group, average revenue in 'Europe' is notably higher in the 'fast' group after the second half of the observation period. None of the four selling regions for the 'very fast' group from the 'Printful' registration origin attains the highest position; instead, they either remain comparable or rank lower compared to those in other onboarding groups.

Hypothesis 2: Revenue Trends
Method 1: Find the total revenue generated by a group in the current month, and then divide it by the number of environments within this group



Method 2: Find the average revenue per customer for months until the current, and then calculate the average within the group



Across registrations originating from 'Shopify,' even though the values of results differ due to both methods of calculations, the direction of trends, and subsequently, the summary is similar. Within each onboarding group, there is one selling region where the average revenue is higher than in other onboarding groups: 'USA' for the 'fast' group, 'Other' for the 'slow' group, and 'Europe' for the 'very fast' group (showing an upward trend only in the latest months since registration).

The Null Hypothesis within 'Hypothesis on Revenue Trends' is mostly rejected, as the 'very fast' onboarding group did not show distinct firm revenue trends among all observed combinations of selling regions and types of registration origins. However, in 'Europe' for the 'very fast' group, there was evidence of an upward trend, but only in the latest months since registration.

Hypothesis 3: Revenue Volatility

Null Hypothesis (H0): Monthly revenue for the 'very fast' onboarding group experiences less fluctuation (has lower revenue volatility) than the 'fast' and 'slow' groups over the long term.
Alternative Hypothesis (H1): Revenue volatility remains consistent among 'very fast,' 'fast,' and 'slow' customer groups over the long term.
Metrics to check the hypothesis: Average Volatility, Absolute Average Volatility, Standard Deviation, Coefficient of Variation.

- **Average Volatility** measures the average variability or fluctuation in monthly revenue for each onboarding group. A higher average volatility indicates greater MoM variation in revenue.
- **Absolute Average Volatility** represents the average magnitude of changes in revenue, regardless of direction. A higher absolute average volatility suggests that, on average, revenue changes are more significant.
- **Standard Deviation** measures the spread of data points around the mean. A higher standard deviation indicates greater variability in monthly revenue, while a lower standard deviation shows more stable, consistent revenue.
- **Coefficient of Variation (CV)** is a normalized measure of volatility, expressed as a percentage. A higher CV indicates a higher relative variability compared to the mean. It helps in understanding the consistency of revenue fluctuations relative to the average.

Lower values in these metrics indicate more stable and consistent revenue changes, while higher values in observed metrics suggest greater variability and fluctuations in monthly revenue.

Volatility metrics

Onboarding groups	average volatility	average absolute volatility	standard deviation	coefficient of variation
fast	73,942	60.96	70.77	34.24%
slow	102,627	69.87	80.94	36.02%
very fast	65,373	57.66	66.43	33.02%
Total	**84,627**	**64.06**	**74.11**	**34.67%**

Volatility metrics

Onboarding groups	average volatility	average absolute volatility	standard deviation	coefficient of variation
fast	82,205	62.97	72.59	33.50%
slow	84,667	68.44	78.62	34.86%
very fast	62,769	57.03	65.02	32.08%
Total	**76,316**	**63.29**	**72.58**	**33.60%**

Standard deviation

registration origin	fast	slow	very fast	Total
Other	**65.45**	**69.05**	**56.83**	**64.61**
Europe	33.95	49.43	38.01	**43.67**
Other	69.77	64.62	79.61	**69.87**
USA	66.40	72.43	56.11	**66.03**
Worldwide	78.84	72.68	61.50	**70.72**
Printful	**72.99**	**85.93**	**68.69**	**77.59**
Europe	63.93	44.16	44.47	**48.02**
Other	49.94	92.09	81.03	**80.13**
USA	72.77	84.34	66.01	**75.78**
Worldwide	94.38	124.42	96.18	**109.51**
Shopify	**72.49**	**92.34**	**75.39**	**81.68**
Europe	49.02	51.30	48.22	**49.46**
Other	42.87	103.47	63.18	**76.97**
USA	81.81	87.57	76.76	**82.02**
Worldwide	67.94	131.40	101.64	**106.57**
Total	**70.77**	**80.94**	**66.43**	**74.11**

Considering both scenarios of selecting registration origins and selling regions, it is observed that the 'very fast' group maintains the lowest results in all volatility metrics. On the one hand, this indicates that this group shows the most stable results. However, at the same time, this is mostly due to the fact that the average revenue for this group has consistently yielded lower results compared to the other two groups.

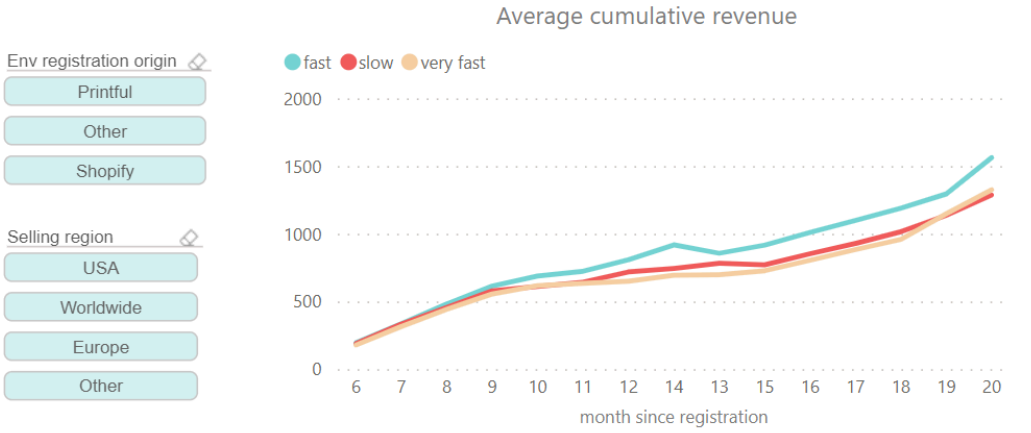
Notably, combinations such as 'Slow - Printful - Worldwide' and 'Slow - Shopify - Worldwide' exhibit higher standard deviations, indicating greater fluctuations in monthly revenue changes. Simultaneously, environments within all onboarding groups with the selling region set to 'Europe' demonstrate the most stable average revenue across months.

The Null hypothesis within 'Hypothesis on Revenue Volatility' is proved, as the 'very fast' group exhibits the lowest results in volatility metrics and experiences the smallest range of fluctuations in monthly revenue compared to the 'fast' and 'slow' groups over the long-term period.

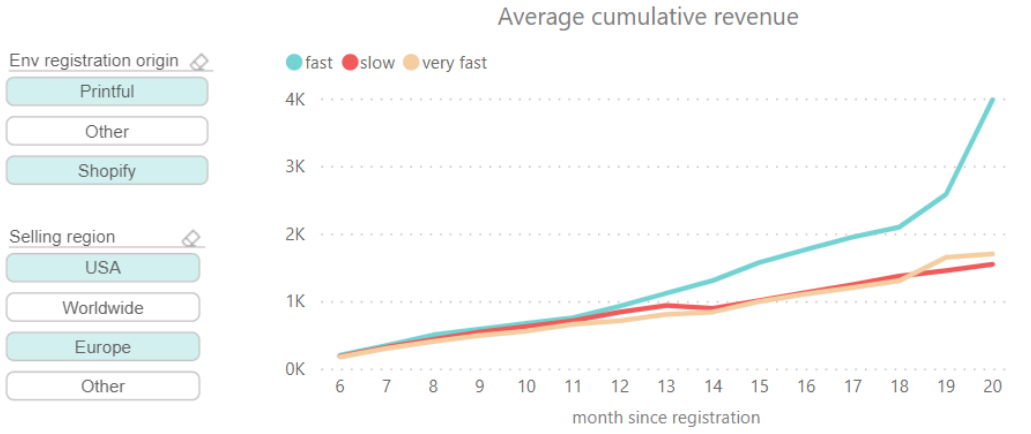
Hypothesis 4: Cumulative Revenue

Null Hypothesis (H0): Significant differences exist in cumulative revenue over time among the 'very fast,' 'fast,' and 'slow' customer groups, with the 'very fast' group demonstrating superior results.
Alternative Hypothesis (H1): Cumulative revenue over time is similar among the 'very fast,' 'fast,' and 'slow' groups.
Metrics to check the hypothesis: Average Cumulative Revenue, Average Cumulative Revenue Growth Rate.

In this hypothesis, environments without revenue in the 6th month after registration are excluded, as 'Average Cumulative Revenue' is calculated with the base period set as the 6th month after registration



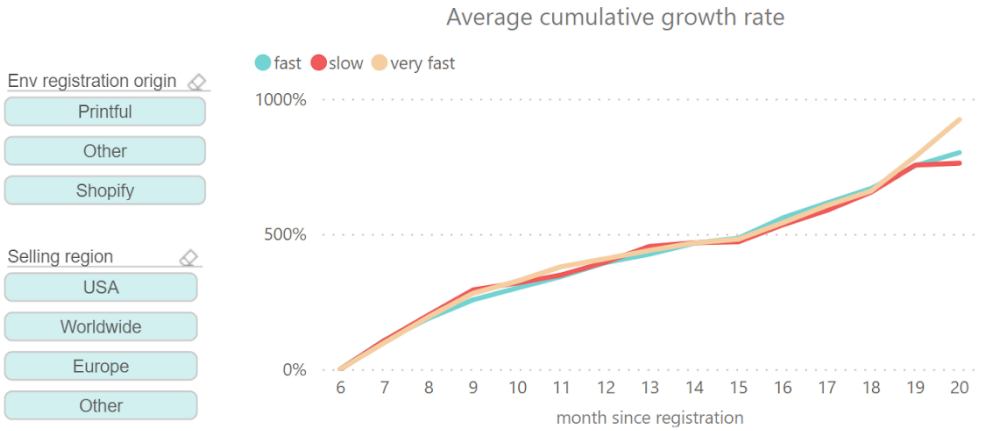
month	fast	slow	very fast	Total
6	194	189	178	186
7	336	333	316	327
8	482	456	443	456
9	614	579	556	577
10	688	611	617	629
11	723	642	635	656
12	809	718	650	713
13	856	782	697	770
14	918	744	694	762
15	916	771	727	784
16	1010	852	804	867
17	1099	929	883	946
18	1189	1015	959	1030
19	1294	1136	1148	1170
20	1563	1286	1325	1350
Total	**648**	**595**	**540**	**586**



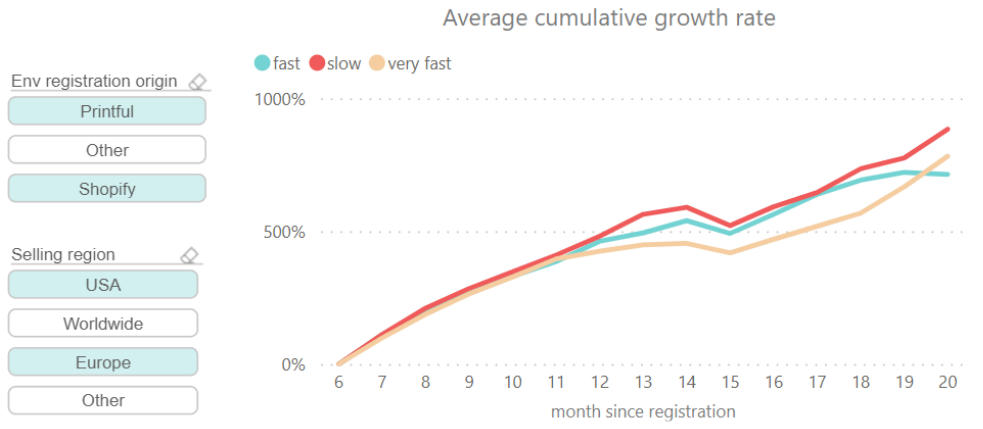
month	fast	slow	very fast	Total
6	199	182	174	182
7	344	316	302	317
8	499	434	404	436
9	586	545	491	534
10	671	625	556	610
11	752	708	658	700
12	924	838	710	813
13	1118	935	805	930
14	1305	892	840	965
15	1573	1008	997	1123
16	1766	1126	1106	1254
17	1949	1244	1199	1377
18	2097	1371	1304	1501
19	2581	1450	1648	1769
20	3982	1546	1697	2140
Total	**680**	**553**	**496**	**558**

The average cumulative revenue exhibits the most significant increase for the 'fast' onboarding group, starting from the halfway point of the period. In contrast, for the other two groups, average cumulative revenue remains relatively stable throughout the observed period.

Conversely, irrespective of registration origins and selling regions, the metric 'average cumulative growth revenue' is nearly identical for each group. Considering registration origins, like Printful, Shopify, and selling regions, like the USA, Europe, the metric 'average cumulative growth revenue' consistently records the lowest values for the 'very fast' group, particularly starting from the 12th month.

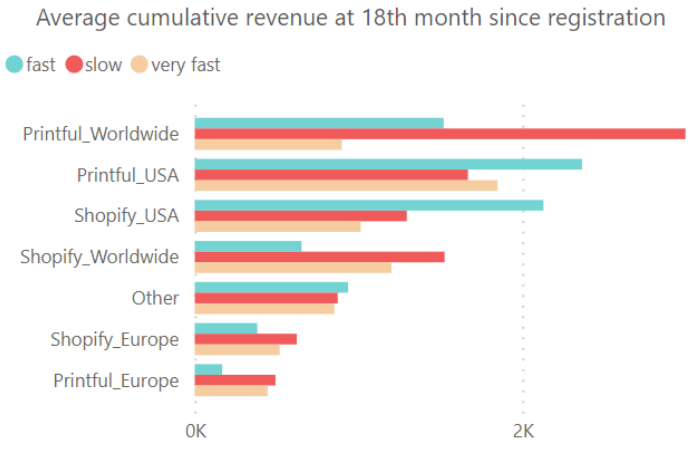


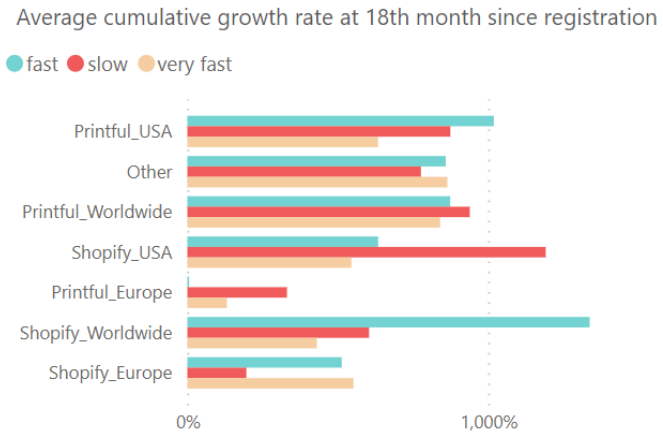
month	fast	slow	very fast	Total
6	0%	0%	0%	**0%**
7	107%	106%	98%	**103%**
8	188%	201%	194%	**196%**
9	257%	293%	280%	**281%**
10	300%	318%	326%	**317%**
11	343%	349%	379%	**358%**
12	394%	396%	409%	**400%**
13	426%	454%	439%	**444%**
14	466%	468%	467%	**467%**
15	485%	471%	481%	**477%**
16	559%	534%	542%	**541%**
17	614%	587%	605%	**598%**
18	668%	654%	659%	**658%**
19	753%	755%	786%	**764%**
20	801%	762%	923%	**821%**
Total	**296%**	**314%**	**294%**	**304%**



month	fast	slow	very fast	Total
6	0%	0%	0%	**0%**
7	110%	111%	99%	**106%**
8	198%	211%	188%	**200%**
9	266%	285%	264%	**273%**
10	331%	348%	328%	**337%**
11	386%	410%	396%	**400%**
12	463%	481%	425%	**458%**
13	494%	564%	449%	**511%**
14	540%	590%	454%	**537%**
15	492%	521%	419%	**480%**
16	564%	593%	470%	**545%**
17	639%	647%	519%	**601%**
18	692%	736%	568%	**669%**
19	722%	776%	667%	**726%**
20	714%	885%	783%	**810%**
Total	**261%**	**277%**	**233%**	**258%**

Across various registration origins and selling regions, at the 18th month since registration, no clear trends indicate that the cumulative average revenue and average cumulative growth rate for the 'very fast' group are the best. Instead, the highest average cumulative revenue at the 18th month since registration is observed in combinations such as 'Slow - Printful - Worldwide,' 'Fast - Printful - USA,' and 'Fast - Shopify - USA,' while the lowest results are seen for combinations like 'Fast - Printful - Europe' and 'Fast - Shopify - Europe.'





The Null hypothesis within 'Hypothesis on Cumulative Revenue' is rejected, as the 'very fast' group does not demonstrate the highest cumulative revenue. Instead, during the latter half of the observed period, the 'fast' group shows notably superior average cumulative revenue. Moreover, beyond the mid-point. the average cumulative growth rates remain relatively similar for both the 'fast' and 'slow' groups, and surpass those of the 'very fast' group.