

## Individual Capstone: Athena Softworks Game Acquisition

### 1. Which game should Athena pursue, if any?

Action Alternatives:

- Acquire Warrior Guild
- Acquire Seraph Guardians
- Acquire Evercrest
- Don't acquire any of the games

Action Standards:

- Market demand should be calculated.
- Market shares should be calculated.
- Profit maximizing prices should be identified.
- Game with the most profit should be acquired.

### How should the game be priced?

Action Alternatives:

- Different price points

Action Standards:

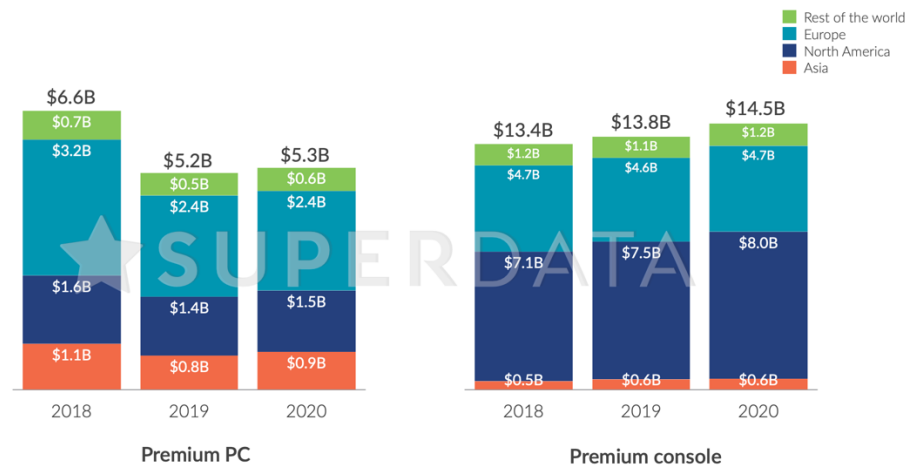
- Customers willingness to pay should be calculated.
- Revenue should be calculated for different price points based on customers willingness to pay.
- Profit should be calculated for different price points based on calculated revenue and respective demands.
- The price point which maximizes the profit should be selected.

2. a. The types of games Athena sells which are premium RPGs for PC fall under the Premium PC games. Market size for Premium PC games were \$5.2 billion in 2019 according to Year in Review report by SuperData. Steam, the distributor of Athena Softworks, holds about %75 PC game global market which accounts for **\$3.9 billion**.



b. Ignoring Covid-19, Market size for Premium PC games are projected to be \$5.3 billion in 2020 according to Year in Review report by SuperData. With the assumption that market share of Steam will stay same, projected market size of Athena Softworks' game will be **\$3.975 billion**.

#### Premium games market and forecast by region<sup>7</sup>



c. I would expect Covid-19 to have a positive impact on gaming market, as lockdowns and school closures increased the time people spent at home significantly. Existing gamers would increase their playtime, while those seeking new hobbies might turn to gaming.

3. a. To determine the number of factors, I looked at explained variance and saw there are 11 principal components which has eigenvalue of greater than 1. I extracted each the factor loadings for the first 11 principal components and reached to table below (I renamed the factors using Quantic Foundry's Gamer Motivation Model):

	immersion	completion	mastery	destruction	discovery	slow-paced	anti-story	independent	design	power	competition
<b>imp.challenge</b>	-0.180142	0.039865	1.122828	-0.241394	0.220638	0.01174	0.094357	0.014641	-0.072129	0.053535	0.00913
<b>imp.unlocks</b>	-0.006976	1.41522	-0.181069	-0.252737	-0.12032	0.294503	0.161056	0.405373	-0.017512	0.065483	-0.298064
<b>imp.customize</b>	0.342375	0.020624	-0.023289	-0.159119	0.181993	-0.015983	-0.156872	-0.074076	1.212812	0.118343	0.07813
<b>imp.difficulty</b>	-0.168373	0.059778	1.109269	-0.221726	0.210359	0.029073	0.138681	0.011996	-0.074451	0.026525	0.020573
<b>imp.characters</b>	0.54802	-0.136649	-0.092196	0.071915	0.140745	-0.055465	-1.417793	-0.008489	0.177397	0.11769	-0.080807
<b>imp.storyline</b>	0.577476	-0.147135	-0.059355	0.096848	0.159139	-0.088142	-1.367779	-0.016939	0.23465	0.07998	-0.127881
<b>imp.mastery</b>	-0.042897	-0.02848	1.329487	-0.146521	0.215237	-0.02918	0.046793	-0.034507	-0.007526	-0.003252	-0.014202
<b>imp.backstory</b>	0.559238	-0.124916	-0.109307	0.072062	0.148942	-0.020227	-1.439119	-0.02041	0.213054	0.042506	-0.114582
<b>imp.dominate</b>	-0.03964	-0.195107	-0.012673	0.063595	0.095343	-0.224576	0.079253	-0.28356	0.071952	0.140501	1.099722
<b>imp.completion</b>	-0.04846	1.484717	-0.180764	-0.228323	-0.122179	0.262128	0.097806	0.362387	0.003855	0.069797	-0.269883
<b>imp.wealth</b>	0.232652	0.085886	0.08417	-0.05721	0.130378	-0.023544	-0.094089	0.20855	0.147764	1.18316	-0.034507
<b>imp.fantasy</b>	1.295837	-0.00647	-0.061237	-0.132988	0.181538	0.001082	-0.229776	-0.016749	0.229645	0.136981	-0.040769
<b>imp.items</b>	1.168561	-0.011759	-0.021372	-0.108822	0.141029	-0.000909	-0.471569	-0.048331	0.193587	0.11437	-0.080544
<b>imp.power</b>	1.300603	0.017691	-0.037588	-0.092568	0.194986	0.013892	-0.248645	-0.020076	0.200358	0.117527	-0.024469
<b>imp.offbeat</b>	0.263589	-0.066433	0.415108	-0.099673	1.331215	-0.023009	-0.102945	-0.029043	0.176057	0.096381	0.066503
<b>imp.collect</b>	-0.009992	1.470323	-0.218976	-0.224841	-0.097833	0.267352	0.160964	0.388571	0.008457	0.134892	-0.293089
<b>enj.excitement</b>	-0.009044	-0.181989	0.035182	0.272104	0.032017	-1.187508	-0.046891	-0.079422	0.008029	0.05419	0.195867
<b>enj.destruction</b>	-0.170911	-0.175979	-0.274672	1.347416	-0.106992	-0.177127	-0.017579	-0.016298	-0.165031	-0.024448	0.09021
<b>enj.others</b>	-0.009489	-0.3075	0.004467	0.038379	0.083831	-0.113617	-0.040105	-1.134634	0.060555	-0.183098	0.515744
<b>enj.react</b>	-0.009021	-0.190072	0.004874	0.175851	0.062156	-1.141068	-0.046302	-0.038709	0.08602	0.069158	0.20207
<b>enj.duels</b>	-0.046099	-0.226886	-0.000035	0.143721	0.098647	-0.256119	0.084809	-0.351153	0.06864	-0.157758	1.294509
<b>enj.strategy</b>	0.06388	-0.153545	1.328994	-0.141552	0.188098	-0.032656	-0.045599	-0.028498	0.056979	0.035516	-0.02387
<b>enj.roleplay</b>	1.310535	-0.022833	-0.058646	-0.093573	0.180002	-0.001897	-0.224771	0.010233	0.210558	0.136863	0.017791
<b>enj.competition</b>	-0.045597	-0.260338	-0.022978	0.152589	0.049992	-0.250757	0.113253	-0.351247	0.075297	-0.104872	1.306664
<b>enj.decisions</b>	0.09915	-0.157564	1.315192	-0.126832	0.172429	-0.057833	-0.021532	-0.027967	0.052286	0.014932	0.022795
<b>enj.common.goal</b>	0.05438	-0.338879	0.043517	0.039478	0.103721	-0.063816	0.00157	-1.332033	0.093177	-0.169006	0.284262
<b>enj.planning</b>	0.038574	-0.194502	1.336091	-0.105399	0.20035	-0.048189	-0.037898	0.008386	0.043991	0.01029	-0.019102
<b>enj.immersion</b>	1.309604	-0.022306	-0.041343	-0.172763	0.167757	0.032924	-0.230865	0.023003	0.213646	0.08962	-0.010318
<b>enj.helping</b>	0.005866	-0.319893	0.024716	0.027793	0.051262	-0.04032	-0.008351	-1.371478	0.080742	-0.12463	0.298023
<b>enj.fast</b>	-0.010117	-0.175839	0.048452	0.193086	0.045263	-1.19708	-0.018159	-0.060146	0.074538	-0.009125	0.209114
<b>enj.guns</b>	-0.159063	-0.162497	-0.327097	1.372941	-0.080441	-0.153605	-0.075232	-0.03172	-0.13996	-0.02008	0.078752
<b>enj.gore</b>	-0.142178	-0.130132	-0.268987	1.383778	-0.137211	-0.269773	-0.043857	-0.020372	-0.140876	-0.08965	0.098656
<b>enj.blow.up</b>	-0.121078	-0.136603	-0.29637	1.357797	-0.122158	-0.218281	-0.057065	-0.059052	-0.183566	-0.073769	0.11559
<b>freq.explore</b>	0.224517	-0.054539	0.377607	-0.125246	1.265384	-0.040585	-0.084635	-0.076883	0.121946	0.090119	0.040892
<b>freq.experiment</b>	0.210281	-0.054493	0.379173	-0.120169	1.308356	-0.046602	-0.094533	-0.075275	0.166437	0.074842	0.055315
<b>freq.study</b>	-0.041046	-0.065369	1.261942	-0.138159	0.233707	0.015727	0.048076	-0.035383	-0.019731	0.047549	-0.017741
<b>freq.char.creation</b>	0.276315	-0.014684	-0.030465	-0.210655	0.180956	-0.131335	-0.167283	-0.078902	1.159301	0.112627	0.032039
<b>freq.stats</b>	0.237463	0.096628	0.062246	-0.095375	0.157408	-0.092017	-0.073331	0.168621	0.136206	1.240996	-0.048556
<b>freq.customize</b>	0.309574	-0.012685	0.020127	-0.168615	0.145776	-0.04068	-0.151772	-0.055292	1.173058	0.083002	0.094512
<b>freq.test.world</b>	0.206146	-0.133699	0.381943	-0.100745	1.26915	-0.076022	-0.135738	-0.072307	0.147965	0.11826	0.119466

Factor 1 – Immersion: The most relevant survey statements for this factor are "Roleplay," "Power," "Immersion," and "Fantasy.". This factor is combination of Story and Fantasy which is named as Immersion in Quantic Foundry's Gamer Motivation Model.

Factor 2 – Completion: The most relevant survey statements for this factor are "Completion," "Unlocks," and "Completion." This factor is named as Completion in Quantic Foundry's Gamer Motivation Model.

Factor 3 – Mastery: The most relevant survey statements for this factor are "Mastery," "Difficulty," "Strategy," "Decisions," "Challenge," and "Study." This factor is combination of Challenge and Strategy which is named as Mastery in Quantic Foundry's Gamer Motivation Model.

Factor 4 – Destruction: The most relevant survey statements for this factor are "Destruction," "Guns," "Gore," and "Blow Up." This factor is named as Destruction in Quantic Foundry's Gamer Motivation Model.

Factor 5 – Discovery: The most relevant survey statements for this factor are "Exploration," "Experiment," "Offbeat," and "Test World." This factor is named as Discovery in Quantic Foundry's Gamer Motivation Model.

Factor 6 – Slow-Paced: The least relevant survey statements are "Excitement," "React," and "Fast." This factor is exact opposite of Excitement in Quantic Foundry's Gamer Motivation Model.

Factor 7 – Anti-Story: The least relevant survey statements are "Characters," "Storyline," and "Backstory." This factor is exact opposite of Story in Quantic Foundry's Gamer Motivation Model.

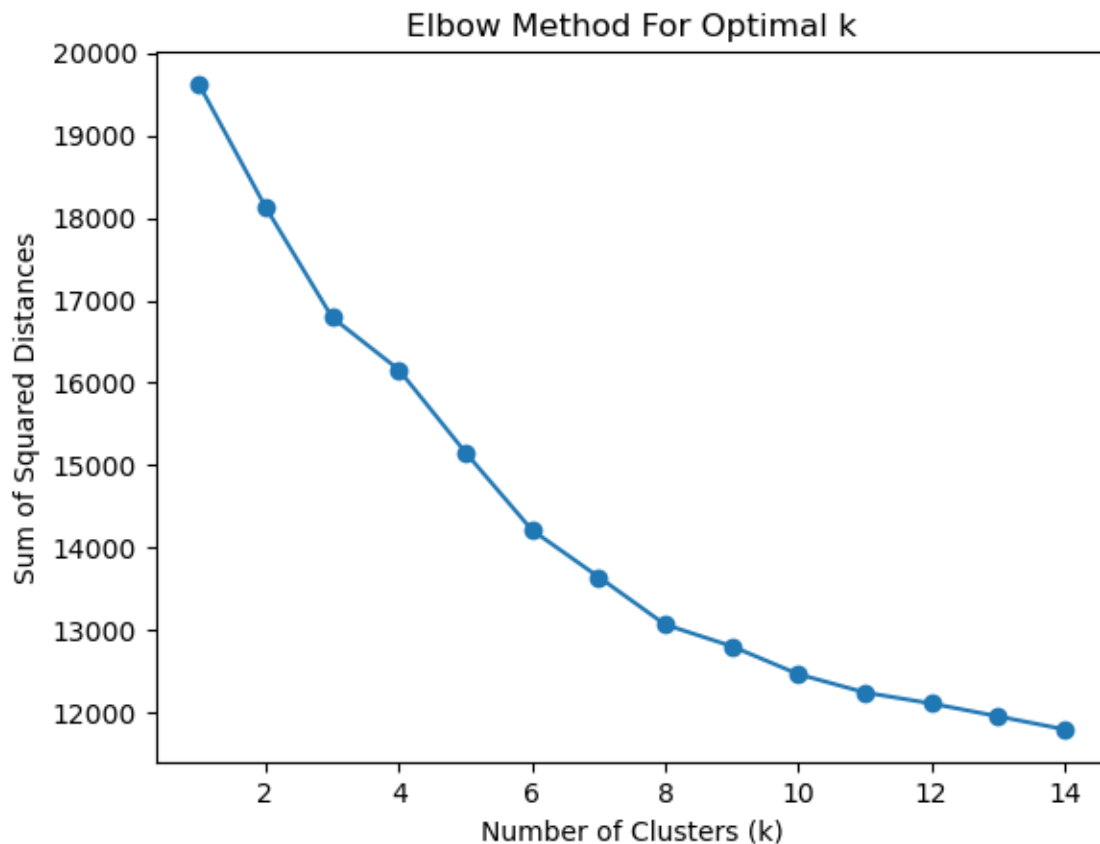
Factor 8 – Independent: The least relevant survey statements are "Others," "Comon Goal," and "Helping." This factor is exact opposite of Community in Quantic Foundry's Gamer Motivation Model.

Factor 9 – Design: The most relevant survey statements for this factor are "Character Creation," and "Customize." This factor is named as Design in Quantic Foundry's Gamer Motivation Model.

Factor 10 – Power: The most relevant survey statements for this factor are "Wealth," and "Stats." This factor is named as Power in Quantic Foundry's Gamer Motivation Model.

Factor 11 – Competition: The most relevant survey statements for this factor are "Competition," "Duels," and "Dominate." This factor is named as Competition in Quantic Foundry's Gamer Motivation Model.

b.



Using elbow method, I decided to go with 6 clusters and ran K-means Clustering.

	immersion	completion	mastery	destruction	discovery	slow-paced	anti-story	independent	design	power	competition
<b>Cluster 0</b>	0.976057	-0.480305	-0.184773	-0.656854	-0.583187	0.630404	-0.037958	-0.299348	0.023048	-0.074886	-0.066671
<b>Cluster 1</b>	1.003993	0.842669	-0.376211	0.401677	0.369084	-0.299508	-0.064432	0.224068	0.00959	0.134922	-0.079257
<b>Cluster 2</b>	-0.647232	-0.541538	-0.838231	1.077812	-0.517299	-0.098144	-0.096283	-0.11311	-0.120711	-0.081487	0.05666
<b>Cluster 3</b>	-0.988685	0.899465	-0.217874	-0.813469	0.097097	-0.096869	-0.1081	-0.177363	0.12337	-0.088575	0.023334
<b>Cluster 4</b>	-0.398947	-1.099709	-0.242154	-0.406292	1.093791	-0.062678	0.086609	0.130387	-0.148695	0.021834	0.120907
<b>Cluster 5</b>	-0.24763	-0.018197	1.340073	0.254892	-0.252474	-0.043386	0.178133	0.15803	0.053366	0.043836	-0.005354

**Cluster 0 – Slayer:** The most relevant factors for this cluster are "Immersion," and "Slow-paced". This cluster is named as Slayer in Quantic Foundry's Player Segments Based on Gamer Motivations Model.

**Cluster 1 – Bounty Hunter:** The most relevant factors for this cluster are "Immersion," "Completion," and "Destruction". This cluster is named as Bounty Hunter in Quantic Foundry's Player Segments Based on Gamer Motivations Model.

**Cluster 2 – Skirmisher:** The most relevant factors for this cluster are "Destruction," and "Competition". This cluster is named as Skirmisher in Quantic Foundry's Player Segments Based on Gamer Motivations Model.

Cluster 3 – Gardener: The most relevant factor for this cluster is "Completion." This cluster is named as Gardener in Quantic Foundry's Player Segments Based on Gamer Motivations Model.

Cluster 4 – Acrobat: The most relevant factors for this cluster are "Discovery," and "Competition". This cluster is named as Acrobat in Quantic Foundry's Player Segments Based on Gamer Motivations Model.

Cluster 5 – Architect: The most relevant factor for this cluster is "Mastery." This cluster is named as Architect in Quantic Foundry's Player Segments Based on Gamer Motivations Model.

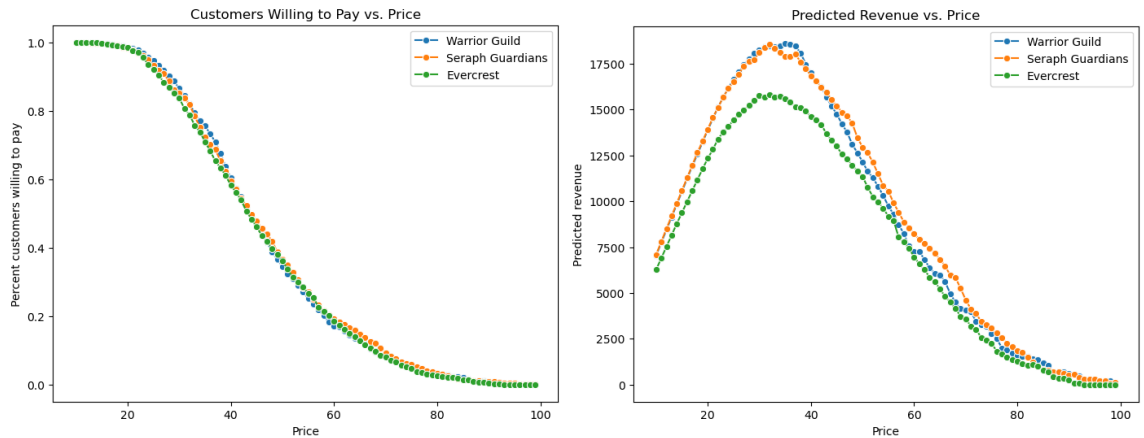
c.

Cluster Averages (Age and Income) and Percentages (Gender) :					
	age	income	female	male	nonbinary
Acrobat	20.841727	28374.1007	35.25%	64.39%	0.36%
Architect	29.006397	57848.6141	39.87%	59.49%	0.64%
Bounty Hunter	33.689904	62608.1731	51.68%	47.60%	0.72%
Gardener	28.57478	53173.0205	57.18%	41.64%	1.17%
Skirmisher	28.47619	57625.3968	38.73%	60.00%	1.27%
Slayer	23.518106	38523.6769	51.25%	48.75%	0.00%

The Acrobat and Slayer clusters tend to be younger and have lower incomes compared to the Architect, Bounty Hunter, Gardener, and Skirmisher clusters. The Acrobat, Architect, and Skirmisher groups are predominantly male, whereas the Bounty Hunter and Slayer groups are more balanced in gender, and the Gardener group is primarily female.

4. a. I handled the missing data by replacing them with null values since there weren't too many, and our analysis focused more on percentages, so it didn't really affect the results. At first, I thought the missing values might be from people who didn't move the cursor because they were fine with the base price shown on the screen. But after checking the data, I didn't find anything that proved this. I also considered that the missing values might be zeros, but then I noticed that some of those games were the respondent's top choice among six options, which wouldn't make sense if they weren't willing to pay anything. So, in the end, I decided to leave them as null rather than assuming a specific value.

b.



Ideal price for Warrior Guild would be \$35 and ideal price for Seraph Guardians and Evercrest \$32 which maximizes our expected revenue for each game. Since there is a steep decrease in customers willing to pay after \$30 for all games and this starts little bit later for Warrior Guild, these prices are the ideal prices for each game.

c.

	coef	std err	t	P> t		coef	std err	t	P> t		coef	std err	t	P> t
const	38.3043	1.540	24.867	0.000	const	32.4444	1.540	21.074	0.000	const	33.8947	1.521	22.279	0.000
Architect	10.2847	1.967	5.229	0.000	Architect	16.2812	1.916	8.498	0.000	Architect	13.4441	2.433	6.614	0.000
Bounty Hunter	12.7784	1.969	6.489	0.000	Bounty Hunter	24.4565	2.072	11.805	0.000	Bounty Hunter	17.7150	2.425	8.746	0.000
Gardener	3.0528	2.079	1.468	0.142	Gardener	12.8033	2.063	6.205	0.000	Gardener	9.2450	2.163	4.274	0.000
Skirmisher	10.0620	2.129	4.725	0.000	Skirmisher	14.1320	2.138	6.612	0.000	Skirmisher	9.7604	2.200	4.436	0.000
Slayer	3.7790	2.096	1.803	0.072	Slayer	9.4809	1.991	4.763	0.000	Slayer	13.2071	2.086	6.332	0.000

-----Warrior Guild-----Seraph Guardians-----Evercrest-----

Across all games, Bounty Hunters are the most interested in buying and Acrobats (Constant in the correlation output) are the least interested in buying (Since all segments have a coefficient higher than 0).

This makes sense since we already knew that Bounty Hunters has the highest income while Acrobats has the lowest. Moreover, we also know that core motivations of Bounty Hunters aligns strongly with the games listed while core motivations of Acrobats does not aligns as strongly with the games.

d.

	Warrior Guild	Seraph Guardians	Evercrest
Price	\$ 35	\$ 32	\$ 32
per_customers_wtp	75.57%	81.81%	78.79%
Percent Real Buyer	22.67%	24.54%	23.64%
Estimated Buyers	2,267,046	2,454,162	2,363,637
<b>Gross Revenue</b>	<b>\$ 79,346,610</b>	<b>\$ 78,533,184</b>	<b>\$ 75,636,384</b>
Royalty	\$ 3,967,331	\$ 3,926,659	\$ 3,781,819
Valve's Share	\$ 18,869,322	\$ 18,706,637	\$ 18,127,277
<b>Net Revenue</b>	<b>\$ 56,509,958</b>	<b>\$ 55,899,888</b>	<b>\$ 53,727,288</b>

Gross Revenue = Price \* per\_customers\_wtp \* 0.3 \* 10,000,000

Net Revenue = Gross Revenue – Royalty – Valve's Share

(I didn't take fixed costs since it says net revenue not profit)

5. a. I assumed that all 6 games would be in the market which means the game we don't buy would be bought by another company. According to survey market shares would be the following:

	Warrior Guild	Seraph Guardians	Evercrest	Devils Gate	Marksman	Quest of the Titan
Market Share	13.18%	50.05%	9.78%	18.60%	2.30%	6.11%

b.

- Prices might differ, and we already know that ideal price for Warrior Guild was higher than Seraph Guardians and Evercrest. Since the equal pricing policy is advantageous for Seraph Guardians, other games might target for people with price sensitivity and lower the game price.
- 1 year is a long time and assuming that an average play time of an RPG game is 30 to 50 hours, customer might buy more than 1 game per year.

Since price difference and elasticity would be difficult and complex to adapt, I just assumed that each game would be priced at \$32 (Warrior Guild would decrease the price since the estimated market share with \$35 is much lower than now). Then I assumed everyone who were willing to pay more than \$64 would buy their second preference and everyone who were willing to

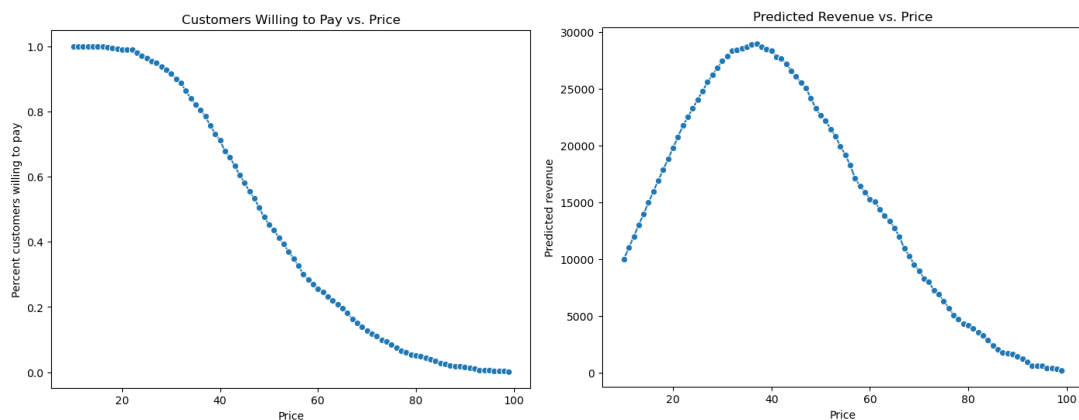


pay more than \$96 would buy their second and third preference too. After calculating it, my new market share estimates would be the following:

	Warrior Guild	Seraph Guardians	Evercrest	Devils Gate	Marksman	Quest of the Titan
Market Share	12.47%	46.23%	9.37%	17.20%	4.80%	9.93%

6.

- If Athena should acquire one game, it should be definitely Seraph Guardians due to its high preference among the community. The other numbers are usually similar, so market share is the only relevant metric here to decide. To decide if Athena should acquire Seraph Guardians or not, we have to examine profitability.
- To decide ideal price point for Seraph Guardians, in addition to above calculation we should also include rankings of games in our calculation too. I filtered the data for people who only ranks Seraph Guardians as their first choice and calculated the ideal price point.



- Ideal price point is \$37 for Seraph Guardians.
- With this ideal price point, 50.05% of people's first choice and assumption of only 30% of people who indicated that they would buy at a given price would buy I gathered the following numbers:

	Seraph Guardians
Price	\$ 32

per_customers_wtp	78.48%
Market Share	39.28%
Percent Real Buyer	11.78%
Estimated Buyers	1,178,355
Gross Revenue	\$ 37,707,350
Royalty	\$ 1,885,367
Valve's Share	\$ 9,926,837
Net Revenue	\$ 25,895,145
Acquisition Cost	\$ 7,000,000
Development Cost	\$ 5,500,000
<b>Profit</b>	<b>\$ 13,395,145</b>

- Since our estimated profit is positive, we can acquire Seraph Guardians.

- To understand which segments we should target, first we should understand the distribution without targeting:

	Distribution
Acrobat	1.02%
Architect	26.40%
Bounty Hunter	31.76%
Gardener	19.90%
Skirmisher	12.24%
Slayer	8.67%

Looking at the data, over 55% of our potential customers belong to the Architect and Bounty Hunter segments. When combined with the Gardeners and Skirmishers, these four segments account for over 90% of the potential market. These should be our primary and secondary target segments moving forward.

So far, we haven't accounted for price sensitivity in our analysis. It's important to note that Acrobats and Slayers are generally lower-income segments, so they might opt for other games if those games are priced lower. This insight actually supports our earlier conclusion: focusing on Architect and Bounty Hunter segments, along with Gardeners and Skirmishers, makes the most sense, as they are less likely to be swayed by price and make up a significant portion of the market.

- Action Summary:
  1. Acquire Seraphs Guardian
  2. Price: \$37
  3. Primary targets: Bounty Hunters and Architects  
Secondary Targets: Gardeners and Skirmishers