Introduction of the Roster Decision

Following my MBA at Katz, I am interested in pursuing a career in sports management, specifically with the National Hockey League (NHL). I am also currently a sports business reporter with Forbes and cover the Pittsburgh Penguins NHL team locally for another outlet.

Over the past six months, one of the most common questions I have received from readers in Pittsburgh is: who will make the opening day roster on defense for the Penguins? I often struggle to answer this question because there are so many factors and variables involved.

Two NHL teams (Calgary and Carolina) and a handful of teams in other sports currently use *AHP* to aid their amateur draft selection process. The simplified, hierarchical model is certainly acceptable in this situation (ranking hundreds of potential draft picks), but when it comes to more complicated roster decisions, the ANP model is ideal because it incorporates dependence.

Building a successful sports franchise isn't just about accumulating the most talented group of players. General Managers must weigh pure player talent along with many other financial, psychological, developmental factors – a task that can be accomplished through a well-structured ANP model.

NHL teams are allowed to play 20 players each game (this typically includes 12 offensive players called Forwards, 6 defensive players known as Defensemen, and 2 Goalies). The Pittsburgh Penguins currently have 12 defensemen under contract who are *capable* of playing at the NHL level this season, but only 6 defense spots available on the roster. While this 'problem' is one that any team, General Manager, or Head Coach would love to have, determining the correct mix of players could be vital to the success of the Penguins this season and in the future.

Due to salary, experience, and other factors, it's assumed that four players are guaranteed to make the team next season:

1. Kris Letang – 25 years old – Salary: $3.5 million
2. Brooks Orpik – 32 years old – Salary: $3.75 million
3. Paul Martin – 31 years old – Salary: $5 million
4. Matt Niskanen – 25 years old – Salary: $2.3 million
5. _____?
6. _____?

I also determined that, despite their capabilities, three players (Dylan Reese, Robert Bortuzzo, and Brian Dumoulin) have little chance of making the opening day roster. They were left out of the model for the sake of simplicity.

This leaves us with five players to focus our decision-making model on:

1. **Simon Despres** – 21 years old – Salary: $840,000 – 6'3, 218 pounds
    - 2009 1st round draft pick
    - NHL Experience: 18 games

2. **Deryk Engelland** – 30 years old – Salary: $566,667 – 6'2, 202 pounds
    - Signed as free agent in 2007
    - NHL Experience: 145 games
3. **Ben Lovejoy** – 28 years old – Salary: $525,000 – 6'2, 215 pounds
    - Signed as free agent in 2008
    - NHL Experience: 95 games
4. **Joe Morrow** – 19 years old – Salary: $894,167 – 6'0, 197 pounds
    - 2011 1st round draft pick
    - NHL Experience: 0 games
5. **Brian Strait** – 24 years old – Salary: $605,000 – 6'1, 200 pounds
    - 2006 3rd round pick
    - NHL Experience: 12 games

These five players will be our alternatives and the goal will be to decide how to rank them from the perspective of the Penguins' management and coaching staff with the understanding that **two** will have to be selected.

As a reporter covering the team over the past few seasons, I feel I have a strong knowledge of the Penguins' internal priorities for making decisions such as this one. I will be incorporating my own judgments (based on personal conversations with each player and watching them play) into the model, but these judgments will be in light of the unique Pittsburgh Penguins approach.

I decided to focus on three strategic criteria with regards to building a successful hockey team.

The least important of this trio is *winning in the future* (beyond the current season). NHL managers cannot ignore the future and focus solely on the present, but the reality is that sports is a "what have you done for me lately?" industry. There is substantial turnover among the manager and coaching ranks meaning that too much emphasis on the *future* could prove worthless if ownership isn't content with results in the *present*.

The second factor is *winning in the regular season*. In the NHL, teams are seeded in the playoffs based on how many wins they accumulate during the regular season. A higher seed means you get rewarded with weaker playoff opponents and also 'home-ice' advantage. This means that in a best-of-seven-games series between two teams, the team with the higher seed will receive four home games and the lower seed receives only three. This can be a crucial factor and means winning as many games as possible throughout the regular season is somewhat important.

However, the ultimate goal for any team is to *win a championship*. Important roster decisions should be made with this in mind. While very short-term factors (month-to-month) and longer-term factors (beyond one season) should still play a role, the Penguins build their team with the goal of winning a championship this season.

Methodology

In order to reach a conclusion, I created a model that I felt included all the important criteria the Penguins would consider with this decision. I will not define and discuss every element, but instead will focus on the important or interesting pieces of the model within each BOCR node.

All BOCR nodes, with the exception of Cost, include both Individual and Team categories.

Benefits			
Individual		**Team**	
Developmental	**Skills**	**Contractual**	**Roster**
Confidence	Offensive	Future Value	Complementary Att.
Experience	Defensive	Salary Cap Space	Role Flexibility
	Awareness		

With regards to benefits, there are some interesting inter-connected factors I tried to capture in this model.

- Player **confidence** is dependent on experience as well as any offensive of defensive skills. I decided that the skill of awareness (with respect to other players during a high-speed game) does not impact confidence, but it is dependent on your offensive skills, defensive sills, and experience.
- From the team perspective, **salary cap space** is a fairly independent factor. The NHL is a league with a salary cap meaning teams are not allowed to spend more than the set limit on player salaries. The Penguins are a franchise that often operates at or near this limit and therefore a player with a lower salary will provide the team with a benefit: they'll be able to devote more financial resources to other players.
- **Complementary attributes** are with respect to other defensemen in the guaranteed Penguins' Top 4 spots listed in the introduction. This group of four players tends to have more offensive skills (despite being defenders) meaning that Engelland or Strait (very strong defensively) would provide more benefit to the Penguins roster. In order to build a team that can have success against a wide variety of teams, it's best to have a balanced roster, not necessarily the most talent.
- Along the same lines, it's also beneficial to have a player that can play in **many different roles**. If injuries occur, adjustments need to be made and oftentimes players in the #5 and #6 spots are counted on to handle larger roles. If the players we choose have the capability of filling a number of different roles, they'll be more helpful to the Penguins roster flexibility should an injury occur to a Top 4 player.

Opportunities	
Individual	**Team**
Developmental	**Roster**
Experience	Chemistry with Teammates
Offensive Skills	Trade Value
Defensive Skills	

The opportunities tend to favor the younger players with great potential (Despres, Morrow).

- By allowing them to make the team at the beginning of the season, you give each player a chance to develop his skills at the highest level.
- This will also allow you to show other teams how talented the various players are which leads to increase **trade value** for the team. Teams are more hesitant to trade for players who only play against minor league competition.
- **Chemistry with teammates** is another interesting intangible factor that would be difficult to quantify without the help of the ANP model. Because Engelland and Lovejoy were on the roster for the last two seasons, they already have established chemistry with their Penguins teammates. By selecting any of the other three players, you'd be giving them the opportunity to develop a similar chemistry that can't be achieved overnight. As I explained in the introduction, success as a team is not just about bringing together the most talented players. Chemistry among teammates is one of those additional factors that can be the difference between winning and losing.

Costs
Team
Roster
Future Value
Minor League Salary
Salary Cap Space
Trade Value

As mentioned above, costs are limited to only Team factors.

- Despite this being a NHL roster decision, **minor league salary** is taken into account here because it does lead to excess costs in certain situations. Engelland and Lovejoy are signed to what is known as "one-way contracts". This means that each player will earn their NHL salary regardless of whether they make the team or not. In the case of Despres, Morrow, and Strait, they are on "two-way contracts" meaning all three players will earn substantially less if they are sent to the minor leagues.
- One interesting cost factor that I feel most NHL teams would fail to consider is **future value**. If you recall, we also used future value as a benefit: if a player makes the team, he will have a chance to develop all season and will be worth more to you (the manager) in the playoffs and beyond. However, because of the salary cap, there is also a flip side to this dynamic. If players with lots of potential (Despres, Morrow) make the team and develop more quickly, they'll also be able to demand more money on their next contract. This could lead to a situation in the future where the Penguins can no longer afford to keep them and therefore it needs to be considered a cost as well. You want your players to develop, but you don't want them to develop *too fast.*

Risks		
Individual	**Team**	
Developmental	**Waivers**	**Roster**
Confidence	Eligibility	Lockout Status
Experience	Claim Likelihood	Injury Contingency
Lack of Playing Time		

- Confidence and Experience risks should be fairly self-explanatory, however **lack of playing time** is another sport-specific factor that definitely needs to be considered. Since these are the #5 and #6 (out of 6) defense spots on the roster, the players chosen won't be relied upon to play more than a few minutes each game. We already discussed the opportunities associated with allowing high-potential players like Despres and Morrow to make the NHL roster, but is it really beneficial to each player to only play four minutes a night? Perhaps it would make more sense to allow both to spend time in the minor leagues where they can play important roles and get plenty of playing time? Some young players respond well to limited opportunities, but others tend to struggle, which can often lead to a **lack of confidence**. Damaged confidence can sometimes be permanent.
- I decided that the waivers section is very important. Without going into extreme detail, what this means is that older players must pass through waivers before being assigned to the minor leagues. Once on waivers, all other teams can 'claim' that player for free. This is an important factor that many fans fail to acknowledge and will play a critical role in the Penguins final decision. If Engelland, Lovejoy, or Strait *don't make the team*, they'll be placed on waivers, allowing other teams the opportunity to steal them away for free if they so choose. Therefore, I concluded that this scenario translates into a big *risk* for Despres and Morrow, the younger players who are not eligible for waivers and can be demoted freely. If Despres or Morrow make the roster, the Penguins risk losing other waiver-eligible players. If waiver-eligible players make the roster, there is no risk of losing Despres and Morrow. Injuries are inevitable and the Penguins will want to retain as many of their talented defensemen as possible for these emergency situations (perhaps in the playoffs).
- Note: All salary information was obtained via the salary tracking website www.CapGeek.com

Data and Results

Benefits: Engelland and Strait have the most benefits due to their complementary attributes. Engelland also has the most experience at the NHL level.

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	1Despres	0.6259	0.2037	0.6259	3
	2Engelland	1.0000	0.3255	1.0000	1
	3Lovejoy	0.5540	0.1803	0.5540	4
	4Morrow	0.2576	0.0838	0.2576	5
	5Strait	0.6345	0.2065	0.6345	2

Opportunities: Despres and Morrow are first-round picks with lots of upside potential. The opportunity to help these two players develop is why they have the most opportunity associated with them.

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	1Despres	1.0000	0.4207	1.0000	1
	2Engelland	0.2156	0.0907	0.2156	5
	3Lovejoy	0.2299	0.0967	0.2299	4
	4Morrow	0.6139	0.2583	0.6139	2
	5Strait	0.3176	0.1336	0.3176	3

Costs: The five players are fairly equal on cost factors but Morrow and Despres lead this category due to the future value dynamic we described above.

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	1Despres	0.8828	0.2483	0.8828	2
	2Engelland	0.6131	0.1725	0.6131	4
	3Lovejoy	0.6527	0.1836	0.6527	3
	4Morrow	1.0000	0.2813	1.0000	1
	5Strait	0.4066	0.1144	0.4066	5

Risks: Despres and Morrow once again lead the category and this time by a wide margin. This is mostly due to the large waiver risk we discussed above.

Graphic	Alternatives	Total	Normal	Ideal	Ranking
	1Despres	0.9830	0.3640	1.0000	1
	2Engelland	0.2246	0.0832	0.2285	5
	3Lovejoy	0.2383	0.0882	0.2424	4
	4Morrow	0.8773	0.3248	0.8925	2
	5Strait	0.3776	0.1398	0.3841	3

From a big-picture perspective, the most important ideas to weigh are the upside opportunity to develop Despres and Morrow vs. the waiver risk factor associated with having them on the team. It is a very difficult decision that teams might approach differently. The ANP model helps put all of this into perspective.

Multiplicative Results:

Name	Graphic	Ideals	Normals	Raw
1Despres		0.425584	0.154231	0.123815
2Engelland		1.000000	0.362398	0.290930
3Lovejoy		0.408461	0.148026	0.118833
4Morrow		-0.342286	-0.124044	-0.099581
5Strait		0.583063	0.211301	0.169630

The results/rankings are the same for the additive (short-term) and multiplicative (long-term) calculations. **Deryk Engelland** is the strongest option by a fairly wide margin and this is not a surprise.

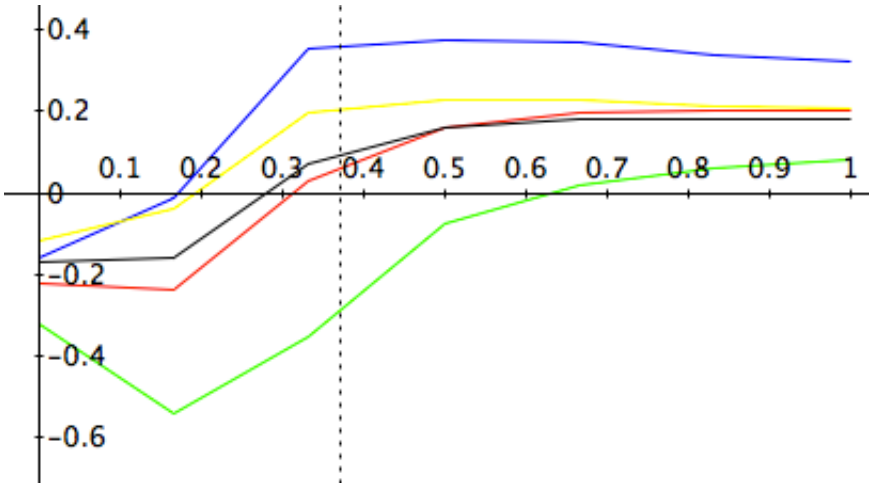
Brian Strait as the second option is an interesting development though. Engelland and Lovejoy are the returning players with NHL experience, while Despres and Morrow are the flashy, young draft picks with lots of potential. When most fans discuss the roster decision, they typically focus on some combination of these four players, ignoring Strait altogether.

He doesn't have substantial NHL experience and he wasn't a high draft pick. Since this decision was made from the managerial perspective, we also ignored the fact that Strait doesn't play in a way that's exciting to watch. Excitement has nothing to do with winning, but fans tend to overvalue exciting players and undervalue consistency.

While Strait doesn't dominate in any of the various criteria or pairwise comparisons, he does well in just about everything. He has a low salary, is eligible for waivers (meaning the team will be more likely to keep him on the roster over Despres/Morrow), and plays a defensive style that is needed by the Penguins. It will be very interesting to see if this scenario ultimately plays out the same way in real life, leaving many fans shocked that Strait earns a spot on the roster.

Sensitivity Analysis:

- Red = Despres
- Blue = Engelland
- Black = Lovejoy
- Green = Morrow
- Yellow = Strait



The section I chose to analyze through sensitivity analysis was the **benefits** section because it was the most heavily weighted (0.37) in my model. Very little would change with regards to the top two

selections -- Engelland (blue) and Strait (yellow) -- if adjustments were made, but I wanted to dig deeper into this area to do further analysis.

Lovejoy (black) and Despres (red) were extremely close in the final results and this was also the case in the Benefits section. While I limited my project goal to finding the best **two** players for the opening day roster, there's also a potential opportunity for the Penguins to keep a third defenseman from this group (and seven total). In exchange, they would keep only 11 forwards instead of the typical 12.

This strategy isn't standard in the NHL, but for a team like the Penguins with so much talent on defense and many of those players at risk of being lost via waivers, this might be something the team considers. If they do, whom would they keep, Lovejoy or Despres?

From the benefits perspective, only when we reach ~50% importance does Despres become the more favorable option.

Summary and Future Research

When I started the model, I assumed Engelland would be a top-two answer but wasn't sure who else would be chosen. The Strait result was certainly interesting and overall I feel this model addressed the complicated issue adequately.

In the future, the team could easily utilize this model for any complicated roster decision by tweaking the criteria a bit and changing the alternatives (players). A similar model could also be used to determine *how much playing time* certain players should receive in a given game. Right now, those decisions are typically made based on gut feelings of the coaching staff.

This model could even be extended to include potential trade possibilities. If the Penguins have an opening on their roster, they could apply the same pairwise comparisons (who makes the most sense as far as salary cap flexibility? Complementary attributes? etc), and also add a cost-to-acquire element. This could be very helpful and would allow the team to bring together the vast knowledge spread throughout the organization and simplify it into a single ANP decision-making model.