The Future of Procurement: A Digital Story?

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Introduction

The goal of our research was to identify digital technologies important for Procurement. The technologies which emerged are: Big Data Analytics, Cognitive Computing, Robotic Process Automation (RPA), Cloud Computing, Internet of Things (IoT), and Social Media. For our research, we conducted a total of 9 interviews as well as a workshop to gain insights into the digital transformation of Procurement. In the following sections the most important findings of our research are described. First, we will provide the results from the methods used to determine it is for a technology to be adopted by Procurement. Next, we will delve deeper into every technology and identify the most important benefits, enablers, and barriers. Lastly, we conclude by summing up the most important conclusions from our research.

Adoption of technologies

The results of the interviews enabled us to create a Digital Adoption Factor (DAF). This factor was established based on three areas which influence the decision to adopt: Technological area, Organisational area, and Environmental area. All areas were measured on a 5-point scale. The technological area deals with benefits associated with the technology. It is fairly straightforward: the stronger the benefits, the more likely it is for a technology to be adopted. The organisational area is a combination of enablers and barriers. The presence of an enabler leads to a higher willingness to adopt, whereas a barrier hinders this willingness to adopt. If the barriers outweigh the enablers in strength it is possible for this rating to become negative, and in the process reduce the likelihood of adoption. The environmental area deals with external pressures to adopt the technology.

The results from the DAF calculation can be seen in Table 1. Here it can be seen that Analytics has the highest DAF (3.07) and thus shows the most promise of being adopted. Internet of Things follows with a DAF of 1.95 and thus also shows promise. Cloud Computing follows closely with a DAF of 1.94. Social Media and Cognitive Computing follow with scores of 1.52 and 1.43 respectively. The technology least likely to be adopted is Robotic Process Automation, with a DAF of 1.09.

	Technological rating	Organisational rating	Environmental rating	Digital Adoption Factor
Big Data Analytics	4.2	2.00	3	3.07
Cognitive Computing	2.3	0.00	2	1.43
Robotic Process Automation	2.7	-1.43	2	1.09
Cloud Computing	3.4	-0.57	3	1.94
Internet of Things	3.7	-0.86	3	1.95
Social Media	2.7	-0.14	2	1.52

Table 1: Digital Adoption Factor

Figure 1 below displays the results from an exercise conducted with Young Procurement Professionals where the participants were asked to allocate an investment budget to the 6 digital technologies we identified. The aim of this exercise was to see which technologies were most likely to be adopted in three different time-frames. We see that in the coming 3 years most investments will be directed towards Analytics (36%). The investment rate for Analytics reduces slowly when the time frames extend in length: coming 3-5 years 30% and over 5 years 16%. When we look at Cognitive Computing we can see the exact opposite: the investment rate for the coming 3 years is 12% of the full budget, for the coming 3-5 years 24% and for over 5 years the investment the rate further increases to 38% indicating the growing importance of Cognitive Computing. Robotic Process Automation shows a relatively steady position in all the three time frames. With 19% for the coming 3 years, the technology is in second place. In the next time frame, coming 3-5 years (16%), the technology has to hand over its second place over to Cognitive Computing. In the over 5 years (23%) time frame the technology climbs up to position two once again. Cloud Computing shows its investment peak in the coming 3 years (18%). When examining the coming 3-5 years (12%) and over 5 years (8%), it is clear that the young Procurement professionals view the technology to be important in the short run rather than the long run. This could indicate that all investments in Cloud will have been done in the coming 3 years. Internet of Things investments remain relatively low across all time frames: coming 3 years (7%), coming 3-5 years (12%), and over 5 years (12%). These low investment rates could indicate that investment responsibility for Internet of Things does not lie with Procurement. The last technology discussed was Social Media. In line with the results from the interviewees, we found that young Procurement

professionals do not view the technology to be very important to Procurement. The investment rate in the coming 3 years would reach the 8%. These rates further decline in the coming 3-5 years (6%) and over 5 years (5%) time frames.
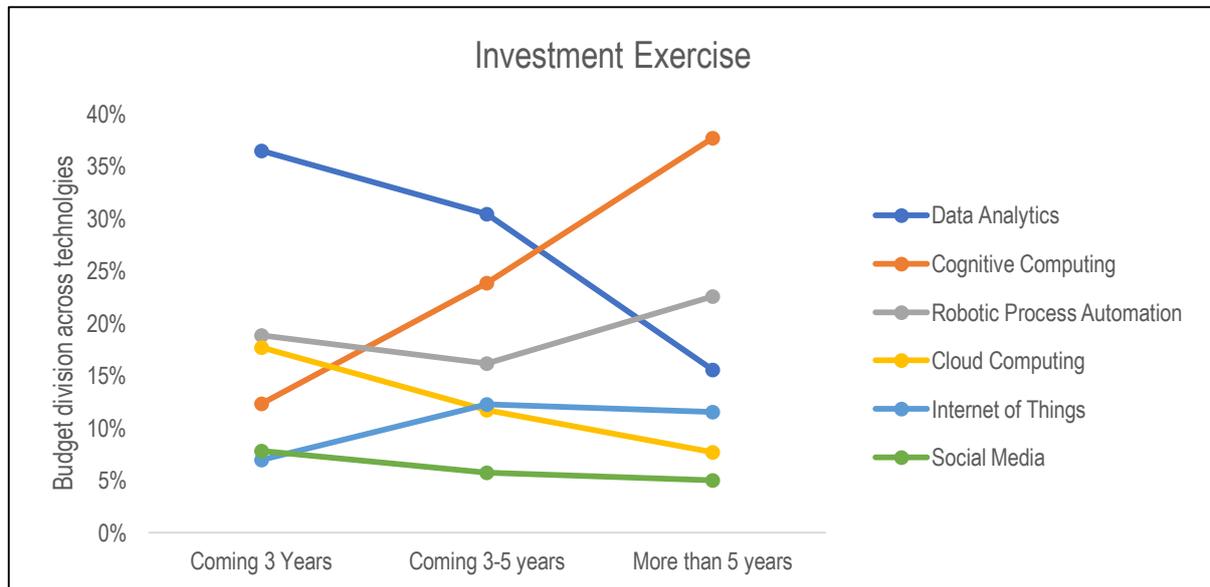

Figure 1: Results investment exercise

Benefits

A large list of benefits associated with the digital technologies was brought up during the interview process. The full results of the benefits can be found in Table 2. When looking at Big Data Analytics we see two prominent benefits, namely enhanced decision quality and increased spend visibility. Looking at the next technology, Cognitive Computing, we find three important benefits. The first is enhanced decision quality. The other two are increased contract compliance and enhanced efficiency of standard processes. Robotic Process Automation only shows two real benefits: reduced cost of purchasing and enhanced efficiency of standard processes. The next technology, Cloud Computing, only delivers one real benefit. Namely, the reduction of cost of Purchasing. Internet of Things has two large benefits of which the first is enhanced traceability within the Supply Chain. Additionally, the technology would benefit Procurement by increasing the planning capabilities. The last technology, Social Media, shows only one real benefit. This technology enhances Procurement's ability to position the organization in both the supplier market, as well as the labor market.

	Big Data Analytics	Cognitive Computing	Robotic Process Automation	Cloud Computing	Internet of Things	Social Media
Reduced Costs of Purchasing	+++	+++	+++++	++++	+++	+
Enhanced collaboration with suppliers	++		+	+	++++	++
Enhanced traceability within Supply Chain	++++				+++++	++
Enhanced decision quality	+++++	++++	+		++	++
Increased contract compliance	++	++++			++	
Increased spend visibility	+++++					
Real time contract management		++			+++	
Sourcing decisions can be better aligned with customer insights	++					
Enhanced supply risk mitigation	++++	++			+++	
Enhanced efficiency of standard processes		++++	+++++	++		
Increased planning capabilities	++++	+++			+++++	
Better control over processes/Supply Chain				++	+++	
Enhanced ability to position your organization						+++++
Reduction of stock					++++	
Real-time understanding of current events		+++			++++	
FTE reduction		+++	+++++			

Table 2: Updated Benefit Table (Max amount of (+) is five)

Enablers

Table 3 shows all the enablers found for the technologies. The two most important enablers for Big Data Analytics are the reliability/quality of data, and the digital skills in Procurement organisation. If the first enabler is present, the quality of the output from an analytics solution will improve. This in turn will make organisations more willing to adopt, since their output will be more reliable. The latter enabler deals with a new type of skills needed for a digitally oriented Procurement function. For Big Data Analytics employees are required who have a good understanding of the types of analyses they conduct. Having these skills in-house will lead to more adoption. Cognitive Computing has two larger enablers, reliability of data and maturity of the Procurement organisation. The first enabler has similar effects when present as the enabler has in Big Data Analytics. The last enabler however, deals with the centralisation aspect. When Procurement organisations mature, more of the data is aggregated at a central level. This in turn leads to a larger amount of data to be used for analysis. The centrally aggregated data can then be used by the cognitive agent, which will result in more informed decisions. Neither Robotic Process Automation nor Cloud Computing show real enablers. Internet of Things shows two medium enablers, namely computing capabilities of the system and interconnectivity between different IT solutions and IT systems. Due to the immense amount of data being created by the sensors from the Internet of Things solutions, a lot of computing power is needed to process all the data: the more computing capabilities you have, the more you can take advantage of the data created. And since Internet of Things depends so much on interconnected 'things', poorly interconnected IT systems will hinder the benefits. This will lead to less adoption. The last technology, Social Media, also has reliability of data as an enabler. The danger of Social Media is that everyone can be responsible for creating data. This may result in some data being false, leading to potential wrong conclusions drawn.

	Big Data Analytics	Cognitive Computing	Robotic Process Automation	Cloud Computing	Internet of Things	Social Media
Reliability/quality of data	+++++	++++				+++
Willingness to share data both internally as well as externally	++++	++			++	
Digital skills in Procurement organisation	+++++	+++	+	+		
Interconnectivity between different IT solutions and IT systems	+	+	+	++	+++	
Computing capabilities of system					+++	
Procurement's lack of own budget	+++	++		++		
Maturity of Procurement organisation	++++	++++				

Table 3: Enablers to adoption (Max amount of (+) is five)

Barriers

The list of barriers found during the research can be seen in Table 4. Big Data Analytics shows

three small sized barriers, data security and data privacy, fear or denial of technology, and high

costs of implementing the technology. Once data privacy issues arise, the possibility arises that

important data becomes off limits for the analysis. This may lead to a lower quality solution,

which in turn makes adoption less attractive. When it comes to fear or denial of a technology,

the problem is often that people who are used to making "gut decisions" will have to start

thinking differently. This leads to fear or denial of Analytics. When looking at both Cognitive

Computing and Robotic Process Automation we see one major barrier: the fear or denial of

technology. Both technologies will take over the more operational tasks where little creativity is needed. This will lead to a lot of resistance and fear from the Procurement professionals currently performing these tasks, since they risk losing their job. The main barrier for Cloud Computing is the data privacy and data security. With the increase in hack attacks you want your data to be safe. As one of the interviewees stated, it does not matter where you store your data, as long as it is safe. Internet of Things displays one large barrier, the high cost of implementing the technology. IoT relies heavily on telecom networks. Whereas these networks are well-developed in the Western countries, the less-developed world is lagging in the quality of these networks. Implementing the technology in the less-developed countries, such as the Eastern European countries, will require significant investments in those telecom networks. The last technology Social Media shows one medium barrier, the defensive attitude of the purchaser. A frequently occurring problem of the purchaser is that data on Social Media is used, however no new data is created on the platform in return.

	Big Data Analytics	Cognitive Computing	Robotic Process Automation	Cloud Computing	Internet of Things	Social Media
Data privacy & Data security	++		+	+++++	+++	+
Fear or denial of technology	++	+++++	++++		+	
High costs of implementing technology	++	+++	++		++++	
Defensive attitude of purchaser						+++
Organisational governance problems (Political games)		++				
Unforeseen social impacts		+++	+++			
Political resistance to technology		+				

Table 4: Barriers to adoption (Max amount of (+) is five)

Discussion & Conclusions

The findings of our research enable us to make statements about which technology is likely to have the most impact on Procurement. When comparing the results from the Digital Adoption Factor (DAF) and the investment exercise of the YPP workshop, we find Big Data Analytics to be the technology most likely to be adopted. The technology will bring data-driven decision making to life for Procurement. Whether it will be through better insights into spend, better insights into potential supply risks, or better information on demand, Big Data Analytics will allow Procurement to make better sourcing decisions, which in turn will lead to reduced costs of Procurement. Overall, the technology will become a quintessential part of the future Procurement function.

When looking at the adoption of Cognitive Computing we find that in its current state, adoption of the technology will be low. However, as the investment exercise showed, as time progresses, the technology will become more and more important, even surpassing Analytics as the most invested in technology. However, for this to happen, the technology will need to be developed further. This does not only apply to Cognitive Computing, but also to Analytics, since the cognitive agent learns from analyses made. Thus, we can see Analytics as a stepping stone for Cognitive Computing. Having said this, we believe it will still take a long time for Cognitive Computing to be adopted by Procurement, potentially even longer than 10 years. But once adopted and matured enough, it will turn out to be one of the most important technologies of the digital Procurement department, as it will be able to conduct an analysis and to decide on the basis of the analysis fully independently.

The results of adoption for Robotic Process Automation showed two sides. On the one hand, it was seen as one of the three technologies to invest in, and on the other hand it was seen as the technology least likely to be adopted by Procurement. This difference of adoption can be partly explained by the Organisational factor of the DAF, where the barriers are more

prominent than its enabler counterparts. This leads to a low negative score for adoption. At present, the first applications of Robotic Process Automation are being implemented on a small scale, mainly in the accounts payable process. The technology will enable a more strategically oriented Procurement function, due to the automation of operational tasks. We therefore conclude that Robotic Process Automation will become part of the future of Procurement. Although the experiments are to be conducted in the near future, full adoption across the broad-scope of Procurement organisations will still require some time. This is further influenced by the potential of job losses the technology will provoke resulting in a negative reaction from the current Procurement employees.

Both the DAF and the investment exercise showed Cloud Computing to be relatively likely to be adopted by Procurement. As most IT solutions are or will become Cloud-native, it will be difficult for the Procurement organisation not to adopt it. The larger IT-vendors will are likely to pressure organisations to adopt Cloud. The technology itself will not have a profound effect on Procurement itself, it will simply become the platform on which Procurement solutions will operate. The adoption is already in full progress, and is expected to grow in the near future.

With regards to Internet of Things we found two contrasting results. The DAF positions the technology as one of the most likely technologies to be adopted, whereas the investment exercise showed the opposite picture. This result did not come as a surprise to us, since we believe Procurement will be affected by the technology, but it is not up to Procurement to actually adopt it. Suppliers will be the party most likely to adopt Internet of Things. Services will be created on the basis of the technology, a concept also called servitization (Neely, 2008), where companies who traditionally offered products now start offering services centred around their product. Procurement in turn will purchase these services utilizing the technology. Thus, Procurement as a function will not feel a direct influence of Internet of Things in that their own

processes will change. However, they will notice that a large part of their suppliers will develop new types of business models based more on a pay-per-use basis. The first companies have already started the metamorphosis towards these service-oriented business models, and more are expected to follow.

For the last technology, Social Media, we also found somewhat contrasting results between the two adoption measures. Whereas the DAF is relatively high, the investment exercise positions the technology as last in every time frame. The technology has been around for quite some time now, yet has still not taken off. Furthermore, it seems that it is not going to make a big impact on Procurement over the next years. The potential for Social Media is present for Procurement, i.e. identifying supply risks through social media outlets, however we doubt that the technology will start playing a role in Procurement either in the near future or in the distant future. This largely due to the defensive behaviour of the Procurement professional.

It is key to realise that we examined the various technologies separately, the digitalization of Procurement, however, deals with all technologies at once. Together the technologies stand strong. Digitalization leads to the creation of a lot of more data (Internet of Things & Social Media), and the data is in turn analysed to gain meaningful insights (Big Data Analytics & Cognitive Computing). With the help of Robotic Process Automation the Procurement professional will be able to spend more time on implementing results from the analyses. All together the technologies will lead to a Procurement function where decisions are based on data and where the operational tasks will be automated. This will enable Procurement professionals to come up with more creative solutions to complex problems, and it will bring Procurement to the next level.