Recommendations for the Key Development Focuses in Automation of the Workflow of City Planners in NSW Within the Next 5 Years

Ben Kelly

Table of Contents

Introduction

This paper deals with the NSW city planning system, examining the primary work habits of its employees, looking at how the limitations in technology affect the field, and in turn how the policies and procedures within the field limit the implementation of automation. Attention is paid to the wholistic nature of technological, environmental, and social factors impacting each other (MacKenzie et. al. 1999). Because of this, the recommendations listed will be on the symbiotic nature of the policies that should change to foster development, and the development areas that should be focused on.

The idea for this project came about from a hackathon I ran through the UTS Programmers' Society (UTS ProgSoc 2019), where the focus was on the development of Sydney as a city through technology. As part of this research, a workshop was co-conducted by me and the UNSW city planning student Pulock Islam as part of his thesis work. The report outlines the structure of the workshop, its benefits, and the resulting arguments and recommendations.

Consultation Workshop Reasoning and Methodology

One of the main concerns with city planning is the lack of technical thinking in how to view their work; to quote the co-runner of this workshop Pulock Islam, "Because city planning has always been seen as a human centred field, the general assumption is that the majority of the field cannot be technologically improved. This ideology bleeds into the whole processes, meaning little attention has been paid to even our workflows." The methodology of our workshop was adapted from the Business Process Automation (BPA) consultation process, modelling the discussion on the top three layers of IT-Enabled Business Transformation (Venkatraman 1994):

- Localised Exploitation: The use of technology to make one specific process simpler, less time consuming, or cheaper (i.e. digitisation of a form).
- Internal Integration: Where an entire workflow (i.e. development applications) is worked into a software solution.
- Business process redesign: Where the workflow itself is modified to work within the constraints and maximise the benefits of a technological improvement. (i.e. adding a new step into public inquiry to utilise social media).

The choice was made to focus on the lower level, evolutionary solutions, due to the logistical nightmare of changing government procedures, and the time scope of this policy proposal being achievable within 5 years.

Participants involved came from a variety of specialisations within our respective fields; We had both software developers, data engineers, IT business analysists, as well as city planners from fields ranging from public transport, development applications, and public consultation. A consent form was given to and signed by the workshop participants. The opinions of both the planners and engineers are their own and based on their experiences in the field, and as such do not represent the specific councils they work for. Because of this, all participants have been de-identified.

The goals of this workshop were to construct a model of the significant bottlenecks in a city planners workflow, and along with exterior research, formulate a position on the key policies and procedures that would need to change to enhance the implementation of automation. The following arguments and recommendations for specific focus areas were derived from this workshop.

Argument 1: Streamlining Development Applications

The nature of development applications, which is a primary workflow for many city planners, is changing, not only due to the streamlining processes with software, but also with the new uses for spaces affecting zoning.

A roadmap of Australian urban development (Pettit et. al. 2018) outlines how the shape of development policies will need to change to fit new uses for city spaces. One such example is the 'gig' economy, where spaces are shared to fit the needs of the owner. "In an era of 'smart cities', there should be policies to support innovation, pilots and testbeds in exploring the potentials of new disruptive technologies." As these policies change, the tools will need to change with them. Existing tools are already implemented in the workflow, Geomaps Trim, and Pathway being the top three brought up by our planners (see Appendix A). Their primary use is as a system for tracking and storing documents relevant to a particular development application. More specific software is suggested to be implemented as a layer on top, as to improve the wholistic feel of the process without 'reinventing the wheel'.

Having a solution in place to further streamline the data collection process will improve the overall quality of applications received by a planner. However, the possibility to implement such improvements is hindered by the current state of form inter-council standardisation.

Argument 2: The Benefits of Standardisation

The most commonly described time sink for our city planners was the cross referencing of multiple documents, forms, and legislation from multiple sources. This is mainly due to the inconsistencies in keywords, referencing, and occasionally the lack of digitization of certain documents (although this is fast becoming less of a problem). Effectively, they said that without easy access to corresponding documents, any automation of application processes would be redundant, as it would always be the limiting factor. The proposed solution to this was standardisation of materials, either through legislation, or with the aid of a software approach.

An example of where this was successful without software was the introduction of the policy to standardise the Local Environmental Plan (LEP) across all districts (New South Wales Consolidated Acts 2011). This policy effectively meant that the content of LEPs across all councils would be numerically referenced, hold a standardised format, and contain certain elements at a minimum. This has had a positive effect on the accessibility of development considerations for non-planners (Lake Macquarie City Council 2015) and improved how the policies are written up online. "LEPs are a key planning document", and one of the most common reference points for a city planner when handling a development application. The drawback of this is the reduction in "creativity" a council has in their plans and can still allow for edge cases when "their provisions can be overridden by SEPPs, so they do not provide the final word on what kind of development is allowed in each zone".

While this is a success, it is seen by developers as not enough for many other documents. The planners brought up that discussions have been made in the past about standardising other common policy documents (e.g. Development Control Plan), however these documents are more based in the cultural values of a local council (outlined in Appendix B), and while some areas (i.e. setbacks) could be standardised. Instead, the proposed solution was not to standardise the documents themselves, but to enable access to a summary system that could be simplified to a standard with greater ease. Similar tools already exist, specifically in the legal industry such as Lexis

Advance (LexisNexis 2019), that summarise laws and cases, allowing a user to faster digestion of material.

From the workshop, I learnt that city planners actually access most of their information through the same channels as public accessible, meaning that any change on the access methods would also be affecting the wider community of developers and application submitters. While improvements to document access can be a massive benefit, case must be taken to ensure that the means of access aren't too specialised for planners as to limit the usability for others.

Argument 3: A City Planners Role in Analysing Public Requirements

Finally, once dealing with forms and procedures, the largest impact a city planner has on their community is the ability to collect, analyse and make decisions based on public requirements and desires. While it is debatably the most important aspect of a city planner (in that there was a brief debate about this during our workshop), it is interestingly enough the area of work least touched by technology. Many of the described methods used to reach out to the public, such as local meetings, mail, and phone calls, are outdated, and used disproportionately by the older population and as put by a participant of the workshop "people with too much time on their hands". As public participation should be representative of a whole, and the context of participation should be reflected in it's structure, as per recommendation 3 of "Public participation in environmental assessment and decision making (Dietz et. al. 2008), the methods to which planners engage with the public must adapt to the technological era. While easier web interfaces and user input were explored, Data Engineering solutions were the primary driver in this conversation due to the recent availability of city-wide data sets.

Social Media has been an ever-increasing channel for community engagement, yet the difficulty comes with filtering and analysing such a mass of data. A solution, described in a London based case study (Kovacs-Gyori et.al 2018), was trialling sentiment and spatiotemporal analysis for social media, using the data received to break down demographics and attitudes. It's conclusion sees its trial of data as a success, "for planning purposes, we can state that despite the limitations described above, by applying our workflow to the sample dataset we can provide valuable information about the spatiotemporal behaviour and sentiment of residents or visitors concerning large planned events". As a boarder solution, more research would need to be done into critical key terms and localisation for NSW residents.

Conclusion

The arguments laid out from the outcomes of our consultation workshop, backed up by the case studies and existing research of solutions, paint the picture of a profession that would benefit greatly from the automation of their less productive, yet still critical workflows. Overall, I believe the workshop was a success, as broadened my understanding of the positions taken in this report.

A big concern in many instances of workflow automation is the loss of jobs in the industry. From our discussions with the planners, the work we would be automating is far from making them redundant. The intended role of a city planner is one of public consideration and city needs, not one of bureaucracy, and any proposed solutions are aimed to free time up from information gathering and put into making informed decisions.

Recommendations

Firstly, this workshop was a one of with a relatively small scale. The benefit of the workshop was not in collecting significant qualitative data, but for my colleague and I to gain insights into each other's

field and explore diverse solutions as a jumping off point. However, this same workshop methodology could be both repeated, and broadened to increase the scope of the findings, and allow for the conversion of categorical and qualitative data into a quantitative analysis of the time spent on procedures and the complexity to implement various solutions.

As for the recommendations based on the existing data and arguments:

- Many of the existing tools listed in argument 1, while not perfect solutions, should not be aimed to be replaced. Rather, a deeper integration with existing software and city planning workflows should be achieved.
- The software developed should reflect the upgrading policies in city development as the idea of 'smart cities' grows.
- While not all forms and policies can be uniform between councils, the formats and navigation can be standardised. Effort should be made to pass through more policies requiring council to fit a standard. This brings with it many benefits, such as the ability to automatically cross reference documents with a simple software solution, and simplify the application process to fewer manual checks, an increasing bulk being automated as the implemented solutions improve.
- Development of a system to summarise and collate relevant documentation is an achievable solution, with existing systems available to act as a basis. This would not only improve the time spent by a city planner but help increase the planning literacy of the community as a whole due to its public facing nature, decreasing the chance of incorrect submissions that take up a planners time.
- Sentiment analysis is an addition to the system, not a replacement. While it can inform a planner of the attitudes of the public in advance, there will always be a place for in person interaction and requirements gathering.
- While it's seen as a 'catch all' solution, machine learning solutions discussed were mostly ruled out due to their costliness and complexity. Instead, more simple solutions were discussed, that while not being 100% automated, saved the time of a planner greatly for most situations.
- A very common point made by our planners during the workshop, was that in ~80-95% of cases (the number varied between scenario), forms, applications, and legislation are very simple and would allow for quite simple automation, but it's the edge cases that prevent any one solution from being perfect. The proposed solution to this is simply: Don't worry about the edge cases. If you design a system that works most of the time and has checks in place to know when a human in needed, you're still saving thousands of hours of time that can be better spent.

References

Scholarly Theory Articles

MacKenzie, D. & Wajcman, J., 1999, 'Introductory Essay: the social shaping of technology', in MacKenzie, D. & Wajcman, J. (Eds.) The Social Shaping of Technology, 2nd ed., Open University Press, Buckingham, pp. 3 - 27.

Dietz, T. and Stern, P.C., 2008. *Public participation in environmental assessment and decision making. National Academies Press*, pp. 223-243

Venkatraman, N., 1994. IT-enabled business transformation: from automation to business scope redefinition. *Sloan management review*, *35*, pp.73-73.

Technical References

Pettit, C., Liu, E., Rennie, E., Goldenfein, J. and Glackin, S., 2018. Understanding the disruptive technology ecosystem in Australian urban and housing contexts: a roadmap.

Lake Macquarie City Council, 2015, *Planning for Non-Planners, January 2015*, viewed 26 October 2019, <https://www.lakemac.com.au/downloads/78D002AC132EA5AECC8981FC8BB6019A035D9483.pdf>

Kovacs-Gyori, A., Ristea, A., Havas, C., Resch, B. and Cabrera-Barona, P., 2018. # London2012: Towards Citizen-Contributed Urban Planning Through Sentiment Analysis of Twitter Data. Urban Planning, 3(1), pp.75-99.

Other References

UTS ProgSoc 2019, *'Code2Change Hackathon'*, Facebook, 26 April, viewed 26 October 2019, <https://www.facebook.com/events/1161737503998764/>

New South Wales Consolidated Acts 2011, E*nvironmental Planning and Assessment Act 1979 - Standardisation of environmental planning instruments,* Sect 3.20, *viewed 26 October 2019* <http://classic.austlii.edu.au/au/legis/nsw/consol_act/epaaa1979389/s3.20.html>

LexisNexis 2019, *Lexis Advance,* viewed 26 October 2019 <https://www.lexisnexis.com.au/en/products-and-services/lexis-advance>

Appendix

Appendix A: Workshop Photos

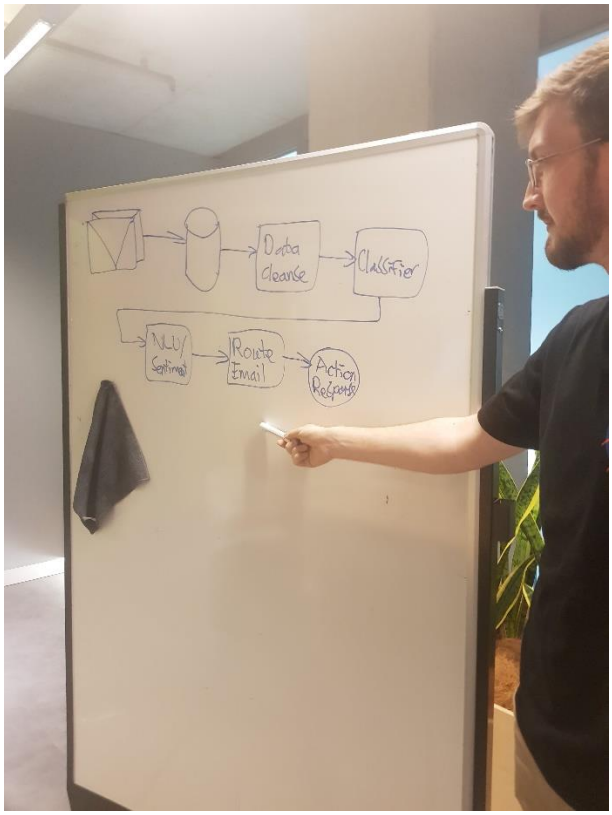

Figure 1 - Sequence Diagram for Machine Learning Classification of Forms

Figure 2 - Outline of the Workflow within Development Assessment

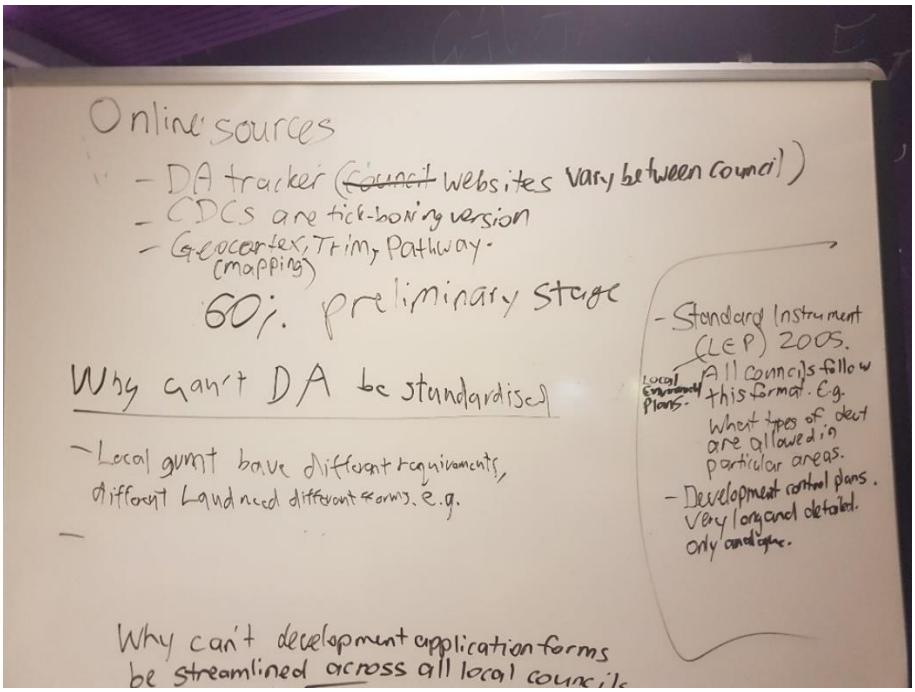

Figure 3 - List of Existing Tools for tracking Development Applications

Appendix B: Excerpt from a Land Use Planner in Consideration to Development Application

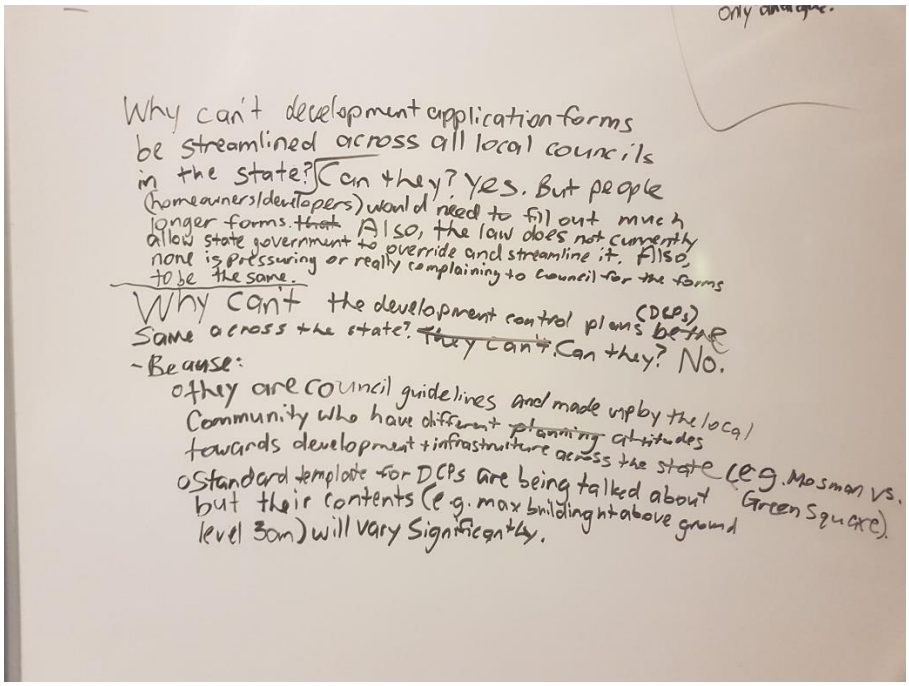

Figure 4 - Original Writing from Workshop

Transcribed:

"Why can't development application forms be streamlined across all local councils in the state? Can they? Yes. But people (homeowners / developers) would need to fill out much longer forms that may not always apply. Also, the law does not currently allow state government to override and streamline it. Also, no one is pressuring or really complaining to council for the forms to be the same.

Why can't development control plans (DCPs) be the same across the state? Can they? No. Because:

- They are council guidelines and made up by the local community who have different planning attitudes towards development infrastructure across the state (e.g. Mosman vs. Green Square)
- Standard template for DCPs are being talked about but their contents will vary significantly"