CORPORATE STRATEGY

TRANSITIONAL TECHNOLOGY IN PUBLIC WORKS: THE 'MAGIC PEN'

JULIEN PATEL, TOWN OF NEWMARKET

The Town of Newmarket is always looking for the 'right' technology to help increase operational efficiencies in an ever-changing digital society. The Digital Pen project is a leading example of transitional technology and partnerships between the Town of Newmarket and its service provider InfoMax Technologies Corporation. The Digital Pen project has helped modernize the Public Works Services (PWS) department without drastically changing existing processes for front-line staff.

I. PROJECT OVERVIEW

In 2015, the Town of Newmarket's Information Technology (IT) and Public Works Services departments partnered with Digital Pen provider Infomax Technologies Corporation to pilot their web-based workflow management system (iFormation) and Digital Pen solution. This article focuses on the integration of the Digital Pen solution in the PWS' Fleet division. The Digital Pen has helped increase Fleet's administrative efficiency in regards to processing work orders by 1200 percent. This project exemplifies how the digital pen solution is both flexible and scalable in the municipal sector.

In the PWS department, Fleet is responsible for providing service to all vehicles and Town owned motorized equipment (assets), whether in-house or through a vendor. Each time an asset is brought to Fleet for repair or servicing, a Fleet work order is created through Newmarket's Work Order Management System, JD Edwards (JDE). A work order form is used by a mechanic to detail the maintenance and repair needs of each asset. Using the Digital Pen solution, mechanics fill out one standardized work order form. The form is a simplified one-page document that allows required data to be captured and exported into JDE. Written entries on each form are recognized through an optical module (scanning device) in each pen.

Each pen stroke on a work order form is digitized through the optical module and saved as data onto a pen's digital storage. The pen is able to save what is written as data because of a dot matrix design that is printed on the work order form by Newmarket's printers. Each dot represents a location on a uniquely identifiable page similarly to GPS coordinates. When a mechanic writes over each dot on the work order form, the pen records and links the data to a unique record on each page. The data is then uploaded to iFormation and the pen is charged once returned to its docking station. The uploaded data is then inventoried, time-stamped, and made searchable through a user friendly web-interface on iFormation. When the recorded data is uploaded, a digitized and editable version is also created into a PDF document.

PWS administrative staff uses iFormation's web-based editor to validate the written entries and ensure the data is converted properly. Once the data is validated, it is uploaded directly into JDE through custom scripting designed by Newmarket and Infomax. The integration increased administrative time efficiency by 1200 percent on average for every work order.

The Digital Pen solution, popularly known by staff as the 'Magic Pen', required minimal change management for frontline staff when implemented. Staff was asked to follow four steps:

1) Use the digital pen when managing work orders;
2) Do not lose it;
3) Draw within the fillable boxes on each form; and
4) Ensure that the pen is docked at the end of the day.

Alternative uses for digital pen technology are top of mind for PWS management due to incredible results and minimal change for staff. The Digital Pen solution is also being seriously considered in other business areas at the Town of Newmarket due to its general applicability and scalability as a workflow solution.

II. TECHNOLOGY & CULTURE

PWS is always looking for ways to optimize their business operations while improving upon their organizational culture. The department began to strategically focus on transforming its various business processes through technology around five years ago. This effort led PWS management to consider enterprise and cloud-based technology with the goal of automating manual processes. Introducing transitional technology in the last year allowed PWS to transition their business operations into the digital era, while not significantly impacting front-line staff. The Digital Pen solution helped Fleet assess their manual, tedious, and time consuming administrative processes through workflow automation.

A key objective of this pilot project is to reduce manual tasks and eliminate duplicated efforts that are performed by staff. The need to increase efficiencies with minimal change to staffs' daily routines was important in managing organizational culture. PWS management felt that minimal change is achieved through flexibility in data collection. Administrative staff re-designed their support processes using iFormation without significantly impacting the front-line staff that collects data.

With each work order, the iFormation system helps create a new database, a historical record, and provides access to data in the field. Staff are also comforted knowing that they can still refer to a paper form in the event that the system is not available. This flexibility is helping to align PWS processes with initiatives such as Open Data and Asset Management without managing a paperless change management approach.

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III. OPERATIONAL EFFICIENCIES

The Digital Pen solution processed 573 work orders successfully from December 2015 to July 2016 (8 months). By using a conservative average, the Town saves over eight minutes per work order, which equates to 76 hours of work since launching the project.

In the past, each work order averaged nine minutes of administrative staff time. The work order process now averages 45 seconds when using the Digital Pen and a standardized work order form. The necessary fields are inputted or checked by the mechanic, which sends programmed codes to JDE automatically. The form reduced the amount of comments needed by mechanics and administrative staff to detail the work.

The old work order process averaged four pages of paper due to the number of hand written comments detailing work. Fleet's simplified one-page work order has also reduced paper consumption by 1719 pages. This automation process demonstrates a performance increase of 1200 percent in administrative efficiency alone, saves paper, and reduces paper storage needs. Staff are also happier as they are not required to undertake tedious and manually intensive tasks – everyone is working smarter.

IV. PARTNERSHIPS

This project was developed on the premise of forging partnerships. Newmarket intended on developing a proof of concept pilot project that was inexpensive but presented the potential of yielding incredible benefits to stakeholders. A standard procurement process lead Newmarket to issue a Request for Proposal (RFP) designed for a digital pen implementation pilot, which led to Infomax being awarded the contract. Infomax was looking to enter the municipal public works sector and Newmarket was looking to try transitional technology without a large capital investment. The pilot's scope included workflow automation in the Fleet division as it relates to Work Orders and the Water/Wastewater division's Locate Request process. The scope was identified by the IT department and the PWS joint steering committee.

PWS brought forward the Digital Pen concept to the IT-PWS steering committee, which is jointly managed between IT staff and PWS management staff on a monthly basis. The steering committee discusses the goals and objectives of different business units in PWS and addresses how IT services and staff can be of support. IT staff frequently work with PWS management, administrative staff, and front-line employees to find cost-effective solutions that meet their unique needs. This partnership between departments has been very successful in evolving how PWS leverages technology and is a model for other departments.

PWS Management intended on modernizing data collection and implementing automated workflow processes while ensuring that staff continue with familiar practices. Front line staff were comfortable using a larger pen while the administrative staff that support mechanics were eager to learn how to use the iFormation platform. Administrative staff sought to increase their productivity and free up time for other tasks through workflow automation. The PWS management team, administrative staff, and the mechanics collaborated through every step of this project and aligned their goals under one vision. Each stakeholder had an understanding of each person's role and ensured that the work orders were managed as efficiently as possible. This team mentality helps the project continue to find further efficiency gains in creating enhanced workflows.

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V. STAKEHOLDERS

Town of Newmarket – Public Works Services

- The PWS management team is responsible for identifying business areas and possible processes that can be improved upon. In pursuing operational optimization, PWS approached IT with an idea for optimizing how staff manually complete forms.
- Mechanics and administrative staff were integral to the implementation of the digital pen project. They worked with IT department's project management staff, Infomax, and their management to uncover every step of how they operate and to modernize their business practice using the Digital Pen solution. They make up the main user-group which supplies quality assurance/quality control staff with needed feedback to maximize Newmarket's resource investment.

Town of Newmarket – Information Technology

- IT project management staff are responsible for managing the relationship between the vendor and the PWS department. They ensure that the project is implemented as agreed upon and on schedule. Project requests and initial software support is provided by Newmarket's IT department before contacting the vendor.

InfoMax Technologies Corporation, a Canadian based company located in Markham, Ontario.

- Infomax presented a unique opportunity for Newmarket to be their first municipal partner. Their business focus is largely supplying the healthcare industry with this Digital Pen technology. PWS management saw this as an opportunity for a pilot project and sought out a partnership opportunity with Infomax. PWS and Infomax identified mutual interests that allowed them to explore the municipal government sector while PWS was able to pilot new transitional technology. Infomax senior staff worked with the Town throughout every project phase. Infomax leveraged their resources to ensure that the Digital Pen project, scope and partnership were a top priority.

VI. FLEET'S NEXT STEPS

Newmarket and Infomax IT staff are implementing an automated data export process from JDE to the iFormation platform. This integration will allow for work orders to be pre-populated and printed automatically with relevant JDE database information, such as the Work Order number, Asset number, and the name of the asset's manufacturer – to name a few. This enhancement will eliminate the dependency on mechanics to assign JDE created work order numbers to digital forms and fill in asset related information automatically - which can take a few minutes when navigating JDE's 'busy' interfaces. Mechanics will be able to select from a pre-populated paper or digital form and begin their work. This

will require only half the writing effort they currently output and a lot less preparation time.

Infomax recently released web-based forms, which is being tested by our Fleet staff this summer. The iFormation platform's flexibility will allow pens, tablets, and computers to be used simultaneously to manage work orders. Mechanics will be able to select different data collection devices that fit their skillsets, which will integrate all collected data into one database within the iFormation platform.

VII. TRANSITIONAL TECHNOLOGY – FLEXIBLE & SCALABLE

Implementation is easy, reasonably priced, and requires little hardware on-site. The software and storage environment can be hosted on-site or securely through Infomax's Canadian hosting environment.

The Digital Pen and iFormation provides tremendous scalability as a solution for any organization. The system can support any standardized workflow process and any form based process, such as inspections or applications. The Digital Pen tracks every independent entry made when a user writes on a form. The user can be identified as well as what they wrote and when they wrote it, which is beneficial when backtracking different phases of the work order.

The number of pens can be scaled to as many as your organization requires. Each dock supports five pens and additional docks can be configured. The dock requires an Ethernet connection to the iFormation platform so that pen data can be uploaded – no major capital investments are required.

The solution's minimal hardware requirements are great from a change management perspective, especially when staff are not comfortable using a computer or mobile technology, or where a pen and paper is simply preferred. The Digital Pen is a natural and easy way to implement data collection and workflow processes. This transitional technology provides Newmarket with the flexibility to collect data through various technologies while maintaining and introducing new processes, which continues to promote incredible value to the organization.

JULIEN PATEL is the Digital Pen Project Lead at the Town of Newmarket and an Applications Support Analyst within the Information Technology department. He provides application and systems support, computing training, and project management leadership for various initiatives. Julien received his Master in Public Administration (Local Government) from Western University and a Bachelor of Arts Honours from Huron College.