

# Optimizing Data Literacy to Leverage Water Utility Performance

Oscar Katumba, WASH Expert

Naturally accentuated by its process orientation, data-yielding activities, and data requirements across each function, **data centrality** qualifies a water utility as a complex system with salutary points across its value chain of water production, distribution, and commercial operations. *To articulate the intractable issues contended with and inspire effective decision making across utility staff, interaction with data to exert benign effects on key performance indicators (KPIs) should neither be relinquished to a few folks nor treated as an esoteric effort.* Akin to how the ability to read and write in the utility's official communication language can foster clarity of vision and purpose, widespread competence amongst staff to mine and disseminate data insights can facilitate issue diagnosis, articulation, rectification, and discern efficiency gains to extend the frontiers of success. Indeed, my experience at Uganda's National Water and Sewerage Corporation (NWSC) as Kampala Water (KW) Kansanga Branch Senior Commercial Officer and at 2ML Consulting Ltd as Finance and Commercial Operations Expert, attests to the notion that organizations registering excellent performances often tend to be high on data literacy. *Data already and often piques the interest of every staff, who invoke it to make a compelling case for change, to inspire staff dissatisfaction with the status quo, make the leverage points manifest, foster peer accountability, and grow performance.* In this paper, I expatiate on my personal

observations and experiences germane to fostering utility data literacy and foregrounding its salutary merits.

Consensus abounds among performance managers and success cravers in organizations that unless one measures it, they cannot manage it, belaboring Peter Drucker's point that one cannot know whether they have succeeded or not, unless success is defined<sup>1</sup>. Gray Mackenzie (2021) ups it further in submitting that, if one cannot measure it, they cannot improve it<sup>2</sup>. *Indeed, even for the seemingly immeasurable things that managers have to ponder upon and make decisions about, proxy variables representative of the of the unmeasurable are still invocable to either understand or appreciate the factors explaining variations in a phenomenon.* See Dr. Deming's "It is wrong to suppose that if you can't measure it, you can't manage it — a costly myth<sup>3</sup>." Also, if one cannot measure it, then one cannot contain it. The referenced statements qualify the value of data in lending credence, specificity, and enormity to variables of interest (VoI). Take, for example, in 2014 at the KW Kansanga Branch, when I grappled with non-revenue water (NRW)<sup>4</sup> at about 33.74 percent. At the time, our non-government billing was on average UGX 60,000,000. I reckoned to my team – which included a commercial officer (CO), billing officer (BO), commercial assistants (CAs), marketing assistants (MAs), and plumbers – that we lose about

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1 <https://www.growthink.com/content/two-most-important-quotes-business>

2 <https://guavabox.com/if-you-cant-measure-it-you-cant-improve-it>

3 <https://deming.org/myth-if-you-cant-measure-it-you-cant-manage-it>

4 The water lost or unmetered, reckoned as the percentage difference between water supplied and water consumed.

UGX 30,552,370 per month due to wasted and stolen water. It was after monetizing the often-reported NRW as a percentage that my team appreciated the enormity of the matter and started extracting pointers to water theft and dysfunctional meters from the consumption data for action. By 2016, NRW had dropped to 28 percent. Ultimately, measuring illuminates the ditches and potholes for dodging, and facilitates staying the course towards desired targets. So, besides high language proficiency, organizations also need staff who are high on data literacy. This is because, while the data centrality of water utilities affords it big volumes of data, most are not optimized and thus require workers who can do what is needed.

However, to market the import of data analysis to water utilities, there is a need to appreciate what constitutes data literacy. In other words, when data literacy is quantifiable or measurable, the lack of it in a utility will arrest the attention of water utility's management team, hence qualify the need for it, especially when an abundance of data literacy yields success in spades. *Data literacy, for all reasons practical and plausible, is the ability of staff to interpret graphical and numerical data, including presenting or reasoning with data, in the forms referenced.* For instance, what I consider the sine qua non of data literacy is captured in Table 1, the NWSC Kampala Water Kasangati

Branch Data Literacy Index (DLI), which basically shows how from primary data one can compute a utility's DLI. *I must hasten to add that even where data analytics tools exist, cured data, for example, must be taken in lest sickening data come out. More so, it is a data literate employee who will make sense of the results from the statistical software.* Either way, data literacy is ineluctable and fits the bill for end-to-end process owners, hence obviating the need for third-party assistance. *It is also important to appreciate that to compass becoming data literate, outside the rigors of knowledge acquisition, is a surefire exercise in futility. It follows that data literacy is knowledge and as such is impartible to the staff lacking it.*

The overarching factors, referenced as must-haves heretofore, include whether the staff was a university statistical major or minor, is a certified data analyst, was in-house trained in data analysis, is in a targeted role, and interacts with data in their role. The latter questions require binary responses, and the factors are weighted for their difference in importance. Despite the subjectivity in attaching weights to the factors and in choosing the factors themselves, in the general scheme of things the attenuation of abstraction and illustration-emphasis are possible.

**Table 1**  
NWSC KW Kasangati Branch Reckoned Data Literacy Index

Kasangati Branch Data Literacy Index							
Factor	Weight	Respondents' Binary Answer			Total Respondents	Weighted Scoring	
		Yes	No	Yes		No	
1 University Statistical Major	0.25	1	5	6	0.04166667	0.20833	
2 University Statistical Minor	0.15	5	1	6	0.125	0.025	
3 Certified Data Analyst	0.25	4	2	6	0.16666667	0.08333	
4 In-house Trained in Data Analysis	0.1	0	6	6	0	0.1	
5 Data Interaction Level	0.1	6	0	6	0.1	0	
6 Targetized Role	0.15	6	0	6	0.15	0	
<b>Total/Average</b>	<b>1</b>	<b>3.66667</b>	<b>2.33333</b>	<b>6</b>	<b>0.58333333</b>	<b>0.41667</b>	
					<b>DLI</b>	<b>58%</b>	

Source: Primary Data

Table 1 shows the DLI of Kasangati Branch is 58 percent and hence above the average of the ideal 100 percent. For one to fully appreciate how the NWSC is high on data literacy, one has to measure the DLI dispersion across the myriad NWSC branches and area offices by simply taking the highest computed DLI minus the lowest one. The latter range when small infers that the variability of data literacy in the NWSC is not big. Furthermore, it is patently manifest that to foster data literacy in a water utility, one has to act on the six factors listed in Table 1. Suffice it to say that data literacy is a function of the sine qua nons referenced earlier. Therefore, for water utilities to grow their DLI, they must ensure that their workers are not wanting in these six factors. Veritable platforms upon which the knowledge to interpret data and communicate with data can be assessed, grown, and affirmed are integral to guaranteeing data literacy and optimizing or valuing data in water utilities.

To nip the deficiency of data literacy in the bud, water utilities should ideally hire data-literate staff, and prospective recruits must take related tests at the interview stage to examine traits of data literacy from the outset. To zero in on data-literate staff, interviews are prefaced with searching for employees who either majored or minored in statistics. The latter holds water, especially for positions where there is high interaction with data and datacentric organizations, such as water utilities. To discount those grounded in statistics or familiar with data analysis for high data-intensity positions is to render collated data otiose, since the ones in the saddle of teasing value out of data are clueless. *The workers who invariably consult with data impress value upon it; otherwise, unoptimized data are a herd of white elephants.* Data literacy in the strictest sense of the phrase infers knowledge about the feedback data potentially give, and since data literacy is basically acquired, employees abounding in it are priceless. The water utility must clearly suppress the urge to compromise, for if the position's language is data, then the ones who are fluent in data fit the bill. For example, a position where one frequently interfaces with customers who need their account

statements interpreted, consumption patterns explained, and billing adjustments made plain, any instance betraying the lack of data literacy can denigrate the utility's image.

Where workers are recruited without prior and comprehensive exposure to statistical training (such as a statistical major, minor, and professional certification), in-house trainings by the utility to scale up data literacy amongst the workers are worth exploring –especially by optimizing hired or existing workers who are fluent in data to train the rest whose data-analysis proficiency is deficient. While at Uganda's NWSC, I would train my Kansanga Branch team on data analysis, given my masterate in finance and macroeconomics. While having trainers trained to train colleagues is relatively low in cost, its demerit is less employee engagement due to trainer familiarity and on-site reminding of pending work<sup>5</sup>. Therefore, engaging the services of experts to facilitate trainings can pack a wallop. External facilitators, with expertise that comes with diverse experience, can arrest the participants' indulgence. In this case, utility leadership can also rhapsodize over data literacy and still remind its workforce of the versatile advantage that is associated with getting skilled in data analysis, which leverages their chances of being deployed anywhere across the data-dependent and driven organization. The latter incentive to market their stock and maintain relevance drives workers, whose interest is piqued to upscale on their own volition, especially where data analysis or data literacy propels them to strategic positions that come with perks and benefits. Workers paying fees on their own, even at times adopting Spartan lifestyles simply to acquire data-analysis abilities, infers the value they attach to data fluency as amplified to them by its advocates in the utility leadership.

Thematic performance improvement programs (TPIPs) helped the NWSC KW mitigate low employee engagement, especially when in-house data-analysis training was employed, as opposed to external expert trainings. In 2016, the NWSC KW launched

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5 <https://www.ict-pulse.com/2017/03/4-ways-improve-data-analysis-proficiency>

the IMPALA (Innovative Management of Territories through Practical Approaches, Leadership, and Accounts Analysis) Program. Its overarching focus was on growing the data analysis skills of KW staff. IMPALA was a six-month TPIP designed in such a way that monthly report submissions and PowerPoint presentations had to be made on registered performance. The unique pro-data literacy feature of IMPALA was that plumbers, meter readers, and territory leaders made the presentations. No key staff at the branch, such as the commercial section head, billing section head, branch engineer, or branch manager, made presentations; even branch janitors were required to present. The latter meant that even though I prepared the IMPALA presentations, as a branch senior commercial officer I not only had to carry all the branch staff along via mock sessions, I also had to explain comprehensively to them what the data analysis results meant. As I limbered my team up for monthly IMPALA presentations, I witnessed how they got into the habit of asking the right questions, besides knowing which KPI data to invoke and proffering the appropriate answers. Also, the fact that we had to report on our IMPALA efforts every month and what they yielded nudged us to stretch for better results to report on. The IMPALA program was such a big boon to the efforts of scaling up data fluency across branch staff, because, in addition to registering KPI performance, among the rewarded was the Best IMPALA Presentation.

Furthermore, I submit that lack of practice makes one a repeat novice. Data fluency is achievable and improvable via interaction with data. Therefore, potential abounds for data literacy to grow with increased exposure to data, even if one simply has to reference to data within their purview of work. Some staff may not be trained data analysts, but given their position's data intensity, they grow into being good at making sense of data to the extent that they can even question the presented data volume, variability, velocity, variety, veracity, and visualization. For instance, in my consultancy work across water utilities — akin to the NWSC's internally delegated area management contracts (IDAMCs) — because the feasibility of broached strategies is prioritized and management by the willing (MBW) is underscored,

interested employees from varied disciplines can bid for area manager positions. Workers do so by expression of interest (EoI) and submission of business plans for targeted areas. So in the practical world of water utilities, either feasible strategies or extenuating circumstances can make a fine-art major a branch or area manager. Therefore, the growth in data literacy comes from interest in data not only as materials for the job, but also as a key success factor for it. This is because in water utility management, the branch's overarching mandate is to sell water, invoice it, and salvage the billing monthly. The iterative nature of the latter infers that with time, the alien-field or rookie branch managers maintain awareness of their jurisdictional facts to, for instance, interrogate anomalous field returns. It suffices to note that learning by repetition means that familiar points of failure are circumventable to register desired or expected results. All it takes is to have an interest in the work, interact with data, ask the right questions, and data literacy will be acquired.

Another case in point on the aforementioned level of data interaction and its salutary effects on data literacy is the multi-layered validation of data christened exceptions reports handling (ERH), which is practiced by the NWSC staff prior to final consumption billing. A typical branch or area office at the NWSC has territories, each with a CA as the territory manager, an MA as the meter reader or bills distributor, and a plumber. The CA reports to the CO, the CO reports to the senior commercial officer (SCO), and the SCO reports to the branch manager (BM). However, every branch has a billing officer (BO). The NWSC in-house billing system generates exceptions or outliers, such as registered consumption for each account (too high, too low, zero, and negative) by computing the average three-month individual accounts' consumption. The anomalies are addressed starting with the CA who engages the MA to proffer plausible explanations or double check on ground for wrong meter readings, leakages after the meter, actual usage, reduced number of users, meter removal to fetch water, vacant houses, defective meters, and meter tampering. The CA affixes his or her signature, and then the report is submitted to the BM via the CO and SCO, each stumbling on data issues that may

have either eluded the preceding checkers or, due to data illiteracy, could not figure them out. At this point direct coaching is carried out, and even when the BM authorizes the addressed anomalies in the exceptions report for final billing by the BO, the BO will still audit the “addressed” anomalies for quality; and if issues still exist, the report will revert to the CA for redress. The repetitive handling of exceptions serves to inure every process actor to data curiosity and analysis, hence growing data literacy. When quality meter reading data are entered into the billing system, accurate billing serves to guarantee the bill’s acceptability, coupled with leveraging the likelihood of salvaging the monthly billing,

When it comes to the potency of targets in fostering data literacy in water utilities, Alexander Pope’s statement that “none can compass more than they intend<sup>6</sup>” pops up in my mind, meaning that rarely anyone achieves beyond what they imagine. So targets literally become the incentive to achieve success, many a time as long as the targeted data are visualized. This way, the success mongers are driven to peep into how success would look by mining the possibilities data divulge. See Figure 1 with me, a commercial operations expert, training the Ogun State Water Corporation (OgSWC)’s Abeokuta Business Unit’s commercial staff in Nigeria. The photos show how linear thinking can be invoked to inform effective strategy formulation and work scheduling for field teams. During the training, I told them about my experience at the NWSC KW Kansanga Branch, where one territory averaged 1,097 active customers per month paying about 141,076,529/=. Given its stretch target of 345,439,970/=:, the territory needed about 2,686 paying customers every month. That meant engaging and reaching at least 122 new customers per day in a month. The territory had a 2,091 active-customer base, while total connections with dormant accounts inclusive were 2,541. So I reckoned that the territory needed for starters all 2,541 customers to pay per month, which meant reactivating 450 customers and an additional 994 accounts from the 2,091 active customers responding per month. The additional 145

customers to make the needed 2,686 payers had to come from new connections. At least 95 customers had to be scheduled for daily engagement. Courtesy of linear thinking, I crafted a good customer growth and engagement strategy, and used it to inure utilities staff to make the most of targets to better strategize and plan their fieldwork.

**Figure 1**  
**Invoking Linear Thinking to Foster Utility Data Literacy**



Source: Primary Data

6 <https://www.goodreads.com/quotes/126992-whoever-thinks-a-faultless-piece-to-see-thinks-what-ne-er>

More so, the visualization of data by all in water utilities helps to pique staff interest in data. This is because a telling part of data literacy is the capacity to ask the right questions that data present. In my consultancy work, I have met staff in water utilities where they maintained a monthly payment ledger, lists of customers billed in a month, and lists of inactive customers. Then I would notice that some customers deemed inactive would actually appear in the payments ledger, while business units would report zero reactivated accounts at the monthly performance evaluation workshops. Unbeknownst to them, they were not cognizant of the glad tidings from the data they assiduously collected. See Figure 2, showing the use of the performance dashboards. In my consultancy work, besides including data referenced reporting and performance milestones in the meeting agenda, integrating peer accountability into branch administration, such as a Duty Week Manager Model, helps in foregrounding the import data and data analysis across the branch staff. While the bottom-up accountability framework is authoritative in nature, with peer-to-peer accountability, workers police each other for answers; the latter thrives on transparency via reports on registered progress and expression of plausible difficulties<sup>7</sup>. With the Duty Week Manager Model at the NWSC KW Kansanga Branch, even a janitor or a plumber could preside over a meeting, an example of how the default performance orientation of meetings serves to nudge the lowest in the structure to understand the story behind the data. Milestones are broadcast for meter reading, bills distribution (where instant billing is absent), and revenue collections (to inform the urgency of fieldwork). The excellent performance registered is then attributable to scotching mediocrity, pretexts, and indifference.

In some water utilities, I have even broached the broadcasting of actual staff performance results against their individual set targets, as opposed to just territorial targets. The latter awakens the lateral thinkers in staff, since their names are on the whiteboard, to mine insights from data, which will help them save face. This is because they then have to

explain the deficits and surplus actual results vis-à-vis the set individual targets. (See Figure 2 showing performance dashboards being utilized to visualize data by water utilities).

**Figure 2**  
Data Visualization to Enhance Data Literacy

WATER SALES MARCH 2021			COLLECTIONS 2021					
RR	RR	RR	(BILLING)	(COLLECTIONS)	GE% (Daily Target)			
A	25,312	44,459	55%	99,124,771	61%	5.7m		
B	56,901	52,126	34%	261,021,748	132	401,196	48%	113.2m
C	32,579	36,622	32%	155,139,875	72	317,228	44%	83m
D	82,201	32,480	29%	142,388,778	72	712,026	49%	7m
E	52,360	31,367	29%	107,182,821	50	670,781	44%	5m
F	37,081	39,426	32%	171,848,899	96	585,360	57%	6.3m
G	50,471	20,563	27%	82,281,468	37	536,881	41%	4.8m
H	23,484	22,948	34%	95,650,146	56	05,457	58%	3.7m
I	316,247	309,993	32%	1,184,420,348	61	651,378	50%	5.5m

A Performance Dashboard at Uganda's NWSC KW Kansanga Branch, Showing Actual KPI Results.



A Performance Dashboard at Nigeria's Osun State Water Corporation (OSWC) Oshogbo Zone, Referenced during a Branch Meeting.

Source: Primary Data

<sup>7</sup> <https://integrispa.com/blog/accountability-in-the-workplace>

When it comes to appreciating how KPI targets help find a place for data literacy in the staff value systems, especially the employees whose primary responsibility is to deliver and drive performance, not many employees do it effectively. In my consultancy work for water utilities across the developing world, I make the most of leading indicators to positively alter the often patchy, lagging KPIs. In water utility management, there are lagging indicators, which are easy to measure but hard to influence. Also, there are leading indicators, which may not be so easy to measure but easy to influence. It suffices to note that the leading indicators actually constitute some of the most significant factors, which explain variations in the KPI performance. Indeed, there are many performance indicators that constitute pointers or indices of a water utility's performance, hence the phrase "key performance indicators"; some are simply not used or preferred. *Examples of lagging KPIs include water sales, billing, and revenue collections, while the leading indicators associated with generated operating revenue, for example, include number of customers engaged, bills distributed, and staff punctuality or attendance as a proxy of staff attitude.* With customer engagement, for example, it is not easy to determine how many customers were reached and really engaged, since the "engagement" may be an effort to wangle private money out of the customer; but if engagement is done for the sake of the utility, then its benefits abound. It is also not easy to vouch for the reported bills delivered to customers, but when actually distributed, they remind customers to pay. Whether it's true that the staff frequently runs in late or calls in sick is also a moot point because of the information asymmetry associated with attendance. This reality got me as a staff supervisor to develop mechanisms, such as proxies, to track and manage leading indicators in order to influence the lagging KPIs. *More so, to convince my team that we were the reason for our patchy performance, I had to get objective with quantitative data, thanks to the credible saying that "data don't lie."* This is because people latch onto data as a definite measure of truth<sup>8</sup>.

Even the core values espoused by a utility can actually help grow data literacy amongst staff. This is facilitated by the fact that evidence suggesting otherwise may abound. Values such as customer focus, professionalism, speed, and efficiency serve to elicit data analysis skills from every staff, especially if the talk is to be walked. Indeed, professionalism means that any staff, whether a janitor or storekeeper, present in the branch office at the time to interface with the customer must be able to explain, for example, an account statement, even when the CA, CO, BO, SCO, and BM are absent. Speed, with or without a billing system due to a power outage or internet connectivity issues, means that the staff must be able to compute the customer's current bill if the customer presents the current meter reading. In this case, data literacy means that a staff member cannot be handicapped by a crippled system. Even where flat rates are employed by a water utility, take for instance 3,000₦ per month, then the customer wanting to pay on the 21st day of the calendar month to go on vacation cannot be frustrated.  $(3,000/30 \text{ days}) \times 21 \text{ days}$  means that the customer has to pay 2,100₦, but not told to play out the month and engender an end of month revenue collection, and risk not collecting readily available revenue. Professionalism infers that the staff is rather knowledgeable and that, with or without secondary support afforded by software, they can still summon their core knowledge to do the needful.

Indeed, efficiency means doing more with less, and this attribute will copiously reside in staff who are able to scour data and, albeit with statistical software, mine timely and effective insights from them without protracted consultations and head scratching. This calls for a staff member who is adept at not just clicking buttons in the system, but also quickly deciphers the results without having to first call the SCO on sabbatical for interpretation. *Economy of time notwithstanding, one cannot relinquish the mining of implications from data to data-analysis software. A data-savvy staff is still required to fabricate actionable insights, optimize current operational efforts, capitalize on new business opportunities, and grow revenue. Take*

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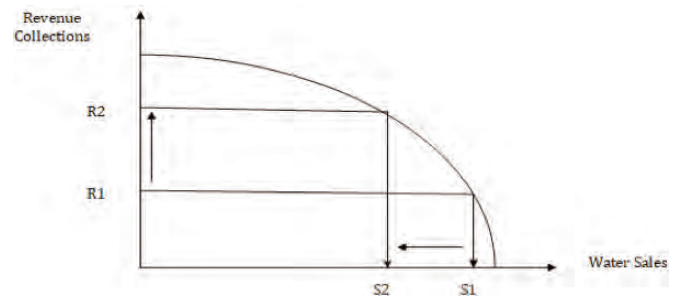
8 <https://forbesbooks.com/data-doesnt-lie-but-it-doesnt-tell-the-whole-truth>

also customer focus, which means knowing and putting customer needs first. This follows that the utility staff must listen to both the expressed and the implied plight of customers. For the implied customer plight, I have come across water utility customers that have discontinued or deferred payments until issues such as paying to wrong accounts are reversed, yet the in-charge officer is still growing arrears with unintentional indifference. This means that customer focus starts with customer data, because customers share tons of information on themselves intentionally and unintentionally. For example, besides the lodged-issues register, customers openly voice their satisfaction or dissatisfaction on social media following good or bad experiences. All it takes for me is to consult with data, to categorize the arrears according to their reasons, to inform my priority accounts for engagement. Of course, the process turns off the indolent, and the idea eludes the less curious.

Given that data literacy is curiosity fed on insights, curiosity transforms it into a human skill. For example, while at the NWSC KW Kansanga Branch, I was confronted with a tradeoff between revenue collections and water sales, and yet my superiors hankered after simultaneous growth in monthly water sales and revenue collections. Apparently every month when our revenue collections would shoot up, our water sales would drop, and vice versa. The patchy results prevailed until I posed to consult my only recourse, data, for the causal factors that explained variations in performance. I discovered that the CAs, who discharged the responsibility of preparing quotidian work for plumbers, evaded the integral part of examining each customer's account statement (**5 territories, and about 2,200 customers per territory**) because of its time intensity. So random service disconnections per day became more appealing in a bid to elicit any collectable money from customers. Supply to over 300 customer premises would be disconnected per week day. However, the pyrrhic gains distorted the monthly customer consumption patterns, such as the structural status of one plumber per territory and relentless supply terminations, precluded timely service reconnection. More so, the indiscriminate supply discriminations betrayed our indifference to customer needs and a

lack of knowledge of our best customers. I sensed the need on my part to burnish the image of my branch by reversing the trend of events. See Figure 3 showing how data literacy facilitated issue diagnosis and resolution.

**Figure 3**  
**Data Literacy Aided Issue Diagnosis & Resolution**

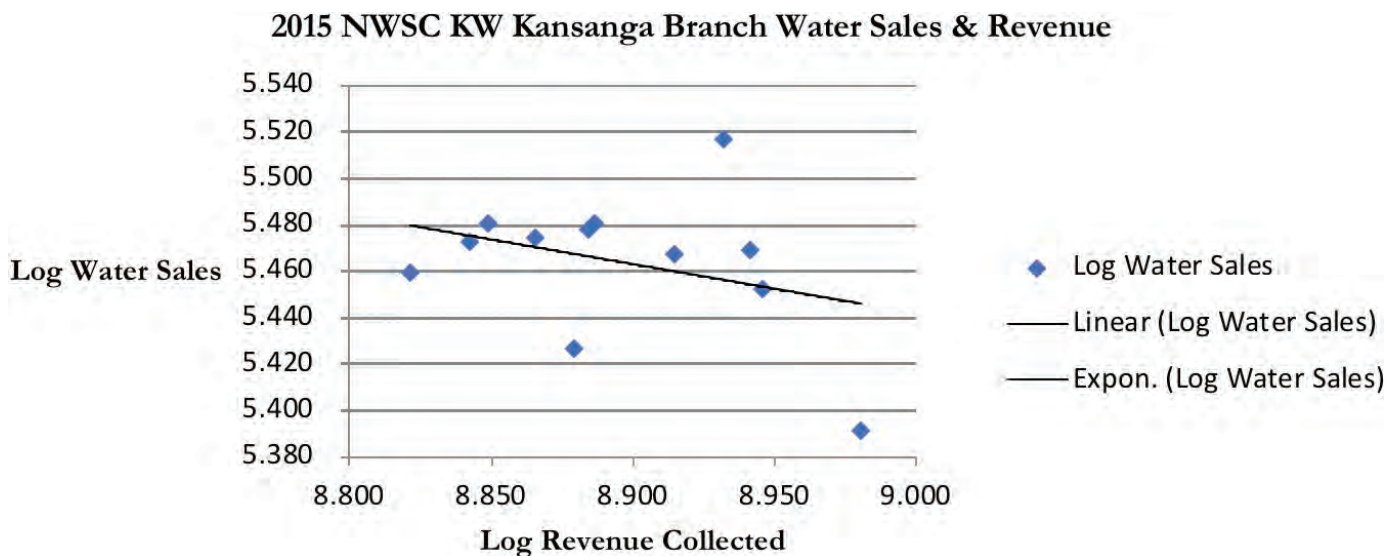


*Indiscriminate supply disconnections to register bill payments, often times inspired a trade-off between Revenue Collections & Water Sales, as pursuit of one reduced the other. R2 for less S2, and S1 for less R1. Enter RBCE (Risk-Based Customer Engagement) Model, to preserve salutary consumption patterns.*

I then invoked the transactional data resident in the NWSC billing system to reckon and attach bill default rates to each customer, including determining fitting treatment options in a matrix, for each payment propensity range. The latter intervention, served to facilitate pinpoint customer engagement for bill payment, without also denigrating the utility's image via prejudicing good customer care. Oftentimes customers of disconnected premises would rightly kvetch about our indifference to their payment history. I initiated the **PODOLA (Phase-out Disconnections on Loyal Accounts) Program**, which signaled to regular paying customers that the NWSC KW Kansanga Branch actually knew them and was keen on treating them appropriately and preferentially. (See Figure 4 showing how data analysis triggered the pondering about the root causes of a practical issue).



**Figure 4**  
**2015 NWSC KW Kansanga Branch Water Sales & Revenue**



Source: NWSC Billing System

Also see Table 2 showing the NWSC KW Kansanga Branch 2015 Water Sales and Non-Government Revenue Collections (NGRC). At the NWSC, revenue

collected from government institutions is within the purview of the headquarters.

**Table 2**  
**NWSC KW Kansanga Branch 2015 Water Sales &**

Month	Non-Government Revenue	Water Sales (M3)	Log Revenue	Log Water Sales
201512	956,095,827	246,320	8.980501423	5.391499676
201511	695,315,096	296,615	8.842181658	5.47219311
201510	881,755,898	283,448	8.945348373	5.452473397
201509	873,129,470	294,555	8.941078647	5.469166399
201508	769,830,813	302,487	8.88639529	5.480706715
201507	821,093,083	292,946	8.914392394	5.466787572
201506	765,773,521	300,758	8.884100345	5.478217188
201505	662,815,112	287,804	8.821392402	5.459096826
201504	733,989,294	298,096	8.865689725	5.474356148
201503	855,459,908	328,551	8.932199661	5.516602793
201502	756,809,536	266,829	8.878986596	5.426233029
201501	705,851,915	302,250	8.848713597	5.48036631

Source: National Water & Sewerage Corporation, Kampala Water

It is patently manifest that data literacy affords utilities myriad benefits heretofore mentioned, such as issue diagnosis, effective strategy formulation, appropriate work scheduling, staff performance orientation, facilitation of peer accountability, and enhancement of staff business awareness. **Furthermore, when it comes to effecting change in human and utility value systems, the *Chin-Benne Empirical-Rational Strategy* via the agency of data literacy indeed packs a wallop.** Staff with the capacity to either tease out business insights from data or be shown with clarity the message from data will constitute the most amenable of beings, especially when selling change to them. On all the performance improvement programs or projects I have worked on, it is effective change management that has made the difference. My Kansanga Branch staff had maintained that the only language bill-defaulting customers understood is service disconnections; but I convinced them with data that doing so indiscriminately did not future-proof our billing. They then acceded to the PODOLA Program. In addition, while at the Baseline Performance Workshop in Nigeria, a utility where I proffered my expertise was encouraged to improve its situation after I shared data from its peers, which performed much better in comparable situations. The aforementioned benefits of data literacy infer the mechanism within which it can exert benign effects on water utility performance.

deliberate effort to understand the story behind the data and transmit it with clarity to others provides evidence of the value utility employees attach to data. It is therefore plausible that data-fluent or literate employees are high performers, and a water utility that has them in spades is bound to perform rather highly. I sampled two NWSC KW branches, the already referenced Kasangati and Nansana branches. As per the carried-out survey and the model I developed to estimate branch staff data literacy, Table 1 shows Kasangati Branch having a DLI of about 58 percent. In 2020, Kasangati Branch had an average annual non-government billing (NGB) of UGX. 564,941,171/=, while its average annual NGRC was UGX. 514,964,190/=. The latter means that with 22 working days, Kasangati Branch registered an average debtors' age (number of days customers take to pay after being invoiced or billed) of 24.135 days  $[(564,941,171/514,964,190) \times 22 \text{ Days}]$ . Its average annual collection efficiency was 91.15 percent, which is the percentage of billing salvaged  $[(514,964,190/564,941,171) \times 100]$ . On the other hand, see Table 3 for the Nansana Branch DLI, which has a slightly higher DLI of 62 percent. 2020 saw Nansana Branch average annual NGB at UGX. 328,964,190/=, while its average NGRC was UGX. 305,758,079/=. Its average annual collection efficiency was 93.193 percent, while the average debtors' age was 23.61 days. A comparative analysis shows that Nansana Branch scored higher in collection efficiency and had a more favorable debtors' age than Kasangati Branch with a DLI score of 58 percent. The DLI range reckoned was 4 percent.

**Table 3**  
**NWSC KW Nansana Branch Reckoned Data Literacy Index**

Nansana Branch Data Literacy Index							
Factor	Weight	Respondents' Binary Answer			Weighted Scoring		
		Yes	No	Total Respondents	Yes	No	
1 University Statistical Major	0.25	0	15	15	0	0.25	
2 University Statistical Minor	0.15	15	0	15	0.15	0	
3 Certified Data Analyst	0.25	10	5	15	0.166666667	0.083333	
4 In-house Trained in Data Analysis	0.1	8	7	15	0.053333333	0.046667	
5 Data Interaction Level	0.1	15	0	15	0.1	0	
6 Targetized Role	0.15	15	0	15	0.15	0	
Total/Average	1	10.5	4.5	15	0.62	0.38	
					DLI	62%	

Source: Primary Data

Examples of *low-risk, less-effort* opportunities for registering plausible progress in nurturing and fostering data literacy in water utilities include the following:

- Integrating numeracy into performance improvement programs by assigning individual employees KPI targets
- Adopting the Duty Week Manager Model (instituting a culture of communicating & arguing with data in meetings or morning briefs)
- Constituting champions for data literacy for strategic business unit heads
- Optimizing monthly documented reporting & PPT presentations for functional heads & process owners
- Embracing data centrality to “walk the talk” of core values
- Integrating leading indicators into excellent performance realization (EPR) models
- Adopt the use of performance dashboards to enhance data visualization

Examples of 5 opportunities for registering plausible progress in fostering and nurturing data literacy in water utilities include the following:

- Organizing data literacy masterclasses for staff
- Hiring data literates as functional heads, process owners, & process Actors
- Creating DL shared services centers
- Incentivizing upscaling in data literacy
- Procuring of data analysis software and IT infrastructure to grow data appeal
- Decentralizing data access & adopt an ERP<sup>9</sup> (enterprise resource planning) strategy

On the whole, the myriad benefits of data literacy, which imply making the most of data, qualify data literacy as an embodiment of the very value that water utilities should attach to data. It is not enough to invest in hardware equipment and statistical software, especially if the end users cannot translate the latter expenses into monetary value, because they cannot optimize data to conduct issue diagnosis,

<sup>9</sup> The ability to maintain an integrated suite of business applications (modules for billing, customer relationship management, finance, inventory management, etc.).

effectively formulate strategy, appropriately schedule work, better engage customers, hold each other accountable, make a compelling call to challenge the status quo, and up employee engagement. Therefore, making water utility staff data literate is an investment in its own right, because in doing so utilities muster minds that are high on business awareness and discern efficiency gains from data to extend the frontier of success. This is because with data-literate staff, good performance is not by chance or seen once a year but is more predictable, repeatable, and growable. To foster data literacy, water utilities must embrace goal specificity via units and individual KPI targets; accountability-driven performance; data-fluent employees; data literacy-focused training programs; incentivizing upscaling in data literacy; and integrating data literacy into performance improvement programs and procurement of IT equipment and data analysis software to manage big data<sup>10</sup>. Non-financial ways of fostering and nurturing

data literacy in water utilities also abound, which when optimized can help in leveraging utilities' performance.

Stanford's Program on Water, Health and Development is working to improve the health and well-being of communities by creating the knowledge, skills and solutions needed to support effective management of water and wastes, and to ensure sustained, equitable access to water supply and sanitation services.

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<sup>10</sup> Huge volume data that grow exponentially.