

merSETA Plastics Chamber Research 2020/21

RESEARCH PROJECT TITLE:

Improving the competitiveness of the Plastic Pipe Sector in South Africa

FINAL REPORT

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Executive Summary

Yes, the plastic pipe industry is in a terrible state... it is the experience of a lot of people that it is very difficult to be a serious player and to sell quality because the competitors are not producing to standard and they're doing it cheaply and therefore you can't get the business.

If you look at any industry around the world, they are always dominated by a few high quality players who have all the quality standards in place and they are producing to the finest tolerances and they are producing at the highest outputs. And this is really where this industry must transition to from where it is now – that is, to a situation where we have really high quality players. *(Founder, Company I)*

The quality of our product is something we pride ourselves on – that is the thing that the right [discerning] client values most... they'll rather pay a little more but then they know they get a quality product. Of course quality also extends to the services you render in support of your products. It is unfortunate that so many manufacturers and suppliers don't share this view. *(Sales Manager, Company F)*

As I said, the whole industry is a little bit sick and government has a big role to play in normalising the industry... getting it back on its feet – if government was driving the projects that need to take place, the industry would rise to the occasion. In this regard, government should stimulate the sector by being an effective consumer of its products... it should get on with clearing the huge backlogs that currently exist. *(Founder, Company I)*

This study was scoped prior to the Covid-19 pandemic hitting South Africa and, as such, an aspect of reflective action-based research response has affected the study process, methodology and findings. The initial project inception was delayed by 'hard lockdown' regulations impeding administrative approvals, followed by limited response to 'virtual' interview requests and online questionnaires and a subsequent change to 'face-to-face' interviews with respondents, which yielded a much deeper and nuanced set of findings. At a late stage in the project, the decision was taken to include municipal respondents which added an important 'voice' to the study and gave an opportunity to hear a government perspective which has added richly to the findings.

The study set out to identify the challenges to an ailing and hugely challenged plastic pipe-manufacturing sector and to make recommendations towards its strengthening. What has emerged is that the pipe-manufacturing sector cannot be viewed in isolation. The impact of the broader supply chain and executive players in that supply chain are critical to the recommendations for improving the current position.

Value chain optimisation and improved quality management systems were sub-questions of the research methodology, and the study finds that much can be learned and leveraged in this

area and the final recommendations look at specific interventions to address this. Over the course of the research, the announcement by government of fast-track high-impact structural reforms, announced in October 2020 under Operation Vulindlela, particularly in water sanitation and reticulation, indicate a government commitment to improving many of the problems that have beset this sector of the economy for many years.

The findings relating to improved quality management systems are closely linked to the supply chain and the opportunities for technical/digital and app based solutions to provide practical and implementable solutions, that with due consideration and planning, could potentially offer significant improvements based on data collection and management innovations and industry driven applications that have credibility with both industry and government. A closer relationship and improved 'co-competencies' between municipal and industry players could potentially improve some of the basic challenges that have beset the supply, installation and implementation of large water and sanitation projects.

The study found some specific skills competencies that need addressing at a technical level, but the more interesting finding was the lack of non-savvy industry leadership and the tendency for "non-engineering" leaders to drive business processes. Bringing engineering back into the business is viewed as critical for success. So too is the inter-generational transfer of tacit knowledge at artisanal level, both in industry and in government. Related to this, and to be addressed in a balanced way with respect to the inter-generational transfer of knowledge and acumen, is the need for the "old guard" to step aside and to support a new generation of pipe manufacturers.

Diversification as a specific research topic, did not emerge strongly from respondents. A few suggestions were made for market diversification and push factors, but it emerged that industry are as limited as their own creative thinking allows. This relates to the limited research and development done both in-house by companies, as well as with academia and testing facilities. This lack of activation means that companies are foreclosing on opportunities for information-driven reflection and decision making. For example, introducing cost-saving mechanisms versus addressing production efficiencies and quality assurance enhancement limits companies, by the nature of their approach to the problem. This issue is deeply nuanced and has interdependencies into the value chain.

Out-dated technology and machinery continues to burden the industry, with the cost and quality of importing machinery a huge factor in company competitiveness, but as with diversification of markets, it is inter-dependent on skills availability, technological and problem solving acumen. More importantly, the sector feels that they cannot carry the financial burden of machinery upgrades alone and they will need government support.

In conclusion, Covid-19 has had a huge impact on the raw material supply chain in the pipe-manufacturing industry, and this continues to impact the industry. However, the human response to the pandemic has seen greater compassion, greater levels of reflection on production processes and the value of agility, flexibility and responsiveness in business. Together with government's commitment to improved water and sanitation projects, and Treasury's financial commitment, it is possible for the pipe-manufacturing sector to effect significant improvements with the right leadership and a collective commitment to utilising digitisation opportunities for supply chain optimisation that is practical and yields positive results.

Overall findings

Baseline

OVERALL FINDING 1

Small, medium and large enterprise differentiation

- *New small enterprises that enter the industry 'on-the-cheap' due to low entry level requirements, can only compete price-wise but they cannot compete at a technical level*
- *A new black entrant to the industry experiences the pipe manufacturing sector as being controlled by 'the old guard' who protect their market share jealously. This is viewed as a significant obstacle for fledgling black owned businesses*
- *Struggle for survival on the part of new small start-up companies is generally attributed to the companies targeting the same market segment*
- *A 'too small to be big, but too big to be small' dilemma arises when companies cannot sufficiently offset the increase in overheads that accompanies company growth (specifically purpose-built machinery acquisition) to be able to compete with bigger players*

OVERALL FINDING 2

Leadership in both government and industry

- *Human & physical resource shortfalls are experienced by both government and industry at leadership level*
- *The shortfalls exist at the level of planning, prioritising and work oversight due to insufficient levels of knowledge and expertise*
- *The shortfall also exists in the engineering skills and expertise required for managing the process of repairing or replacing old infrastructure particularly within government*
- *For industry there is a lack of a nuanced 'nitty-gritty' understanding of market and organisational/ operational dynamics*

OVERALL FINDING 3

Value chain pressures and quality management issues

- *Value chain pressure on manufacturers is a constant that has been exacerbated by Covid-19*
- *Quality control shortcomings are not so much about the quality management systems per se but rather about the policing of quality inspections. Inspectors need to receive the appropriate training to guarantee that 'what goes into the ground is what was specified as per design'*
- *On-site quality controllers are fingered for lacking in basic plastic pipe-related knowledge and awareness*
- *Clients, engineers and contractors are castigated for 'superficial compliance' and for treating quality control as a 'rubber-stamping exercise'. For example, abiding by 'generic ISO 9000 paperwork' as opposed to asking for detailed Certificates of Authenticity (CoA)*

- *Industry reports price-cutting practices by some of the industry via the manipulation of polymer content. These corner-cutting practices compromise the original specification with respect to materials usage*
- *There are unscrupulous and opportunistic' traders who enter the public procurement space who do to not carry any production and overhead costs nor do they employ any people, but are merely middlemen in the transaction*

OVERALL FINDING 4

Greed and associated sub-standard products and services undermine the industry

- *Existing (market-dominating) companies.* *In their quest to secure dominance in a particular product market, companies eventually fail because of unsustainable business models and income streams with respect to that particular product*
- *New entrants to the market.* *In their quest to 'get rich quick', new entrants to the market fall foul of charging too-high prices for products and services at the outset. They are critiqued for not being prepared to first grow their businesses into the kind of prices they're charging at the outset. Consequently, they fail by way of pricing themselves out of the market.*

Key challenges facing the plastic pipe sector value chain that inhibit plastic pipe sector growth and competitiveness

OVERALL FINDING 5

Raw material constraints

- *Fluctuation in raw material supply or availability and quality (HDPE) and volatility in the price of raw materials is seen as a significant challenge*
- *Lack of substantive research and development and associated innovation concerning the local production of raw materials is viewed as a challenge. A result of this is industry merely copies developments in the international market*

OVERALL FINDING 6

Outmoded pipe-making technology and machinery

- *Generally aged or outdated pipe-making technology and machinery undermines company's competitive pipe-making capability,*
- *Industry's view is that this impediment is unlikely to be turned around without material support from government coffers*

OVERALL FINDING 7

Critical human resource, knowledge and skills shortcomings

- *Managerial level knowledge and skill gaps*
- *Technical skills shortfalls*
- *Trans-generational transfer of knowledge and skills*

OVERALL FINDING 8

Research and development disconnect

- *Similar to the finding around raw material research, the low levels of collaboration between industry and research institutions around industry-specific research activity is seen as a critical industry weakness*

OVERALL FINDING 9

Government failing to deliver on its mandate for demand-led sector growth and strengthening

- *Government is seen as the single most significant 'strategic' partner and end-user of major pipe infrastructure and maintenance projects in support of economic recovery and growth, but Government is not fulfilling its mandate*

Overall recommendations

OVERALL RECOMMENDATION 1

Optimising the value chain

- *Improve quality management and control throughout the value chain from specification, to manufacturing to onsite installation and welding*
- *This optimisation in terms of quality could benefit from digital systems and Certificates of Authenticity*

OVERALL RECOMMENDATION 2

Learning from Covid-19

- *Keeping the value chain short has advantages*
- *There are benefits that can be derived of ICT applications*
- *Organisational adaptability enables better market responsiveness*

OVERALL RECOMMENDATION 3

Strengthen and empower industry bodies

- *SAPPMA could set a minimum price for a month as a benchmark*
- *To level the 'playing fields' revert back to ECSA fee scales for tender submissions*
- *Industry power can benchmark testing facilities and promote availability and access to the facilities*
- *Investment in modern machinery to promote innovation, production efficiencies and competitive pricing*

Conclusion

Having considered the perspectives of informed respondents located in various industry settings, as well as local government, it can be concluded that, yes, the plastic pipe sector is indeed in distress, by-and-large, in regard to both company and overall industry sustainability and performance. Accordingly, a range of contextual factors responsible for specific areas of weakness/ underperformance across the value chain have been comprehensively identified and described which, cumulatively are responsible for compromised quality of products and services that, in themselves, reflect on industry shortcomings.

That said, it can also emphatically be concluded that there is no reason why the fortunes of this relatively small and not-exceptionally-complex economic sector cannot be turned around by way of visionary leadership and broad-based commitment and effort so as to assume world class status. There are too many historical and current examples of sustained performance excellence for such an eventuality not to be considered possible.

Introduction

Plastic pipe is no longer seen as an “alternative” pipe material and globally it is estimated it has a share of more than 50%. In South Africa 150 000 tons of PVC and HDPE pipe (approximately 30 000 km of pipe) are produced annually and used across a wide spectrum of industries including mining, civil, irrigation, industrial, telecommunication and building. Plastic piping systems are relied upon to provide integral long term and extremely important infrastructure to the country, including sewage, water, telecommunication and electricity supply. In addition, South Africa is rapidly becoming an arid country where water is a scarce resource. With increasing demand and inconsistent rainfall, huge losses in water pipeline leakages are estimated to be at 40%. The country requires reliable, leak-free and durable piping systems that will not corrode. There is also a need to rehabilitate old pipelines.¹

As such, plastic pipes comprise a vital infrastructure pillar in South Africa supporting water and reticulation systems, amongst other things. However, over the last 12 years the industry has seen negative growth (0.7 percent) despite supply exceeding demand. Industry’s current machine utilisation is 65 percent. This situation results in a fight for survival by companies. One of the plastic pipe industry sector’s flagship companies shut its doors completely and another closed down some of its business units, resulting in close to 500 people losing their jobs in the last year and a half.²

1. Research focus, design and methodology

1.1 Focus

In all, the South African pipe manufacturing industry is not globally competitive on a sustainable basis – despite the fact (ironically) that it is identified in the South African Industrial Policy Action Plan (IPAP) as a growth industry. To the contrary: it finds itself in deep distress.

Key contributing factors noted in this regard include the following:³

- lack of investment by government at all levels, for example, promised major expenditure led industry to respond by increasing capacity, which is then under-utilized – a situation exacerbated by a host of challenges in regard to government procurement practices and indeed capacity-related aspects,
- labour force challenges,
- SABS underperformance,
- lack of a pervasive research and development culture (industry-wide at company level), a situation exacerbated by a disconnect between research bodies and industry,

¹ Source: SAPPMA AGM October 2019

http://www.sappma.co.za/images/documents/Press/2019_SAPPMA_AGM_POSTEVENT_PRESS_RELEASE_FINAL.pdf

² Source: SAPPMA AGM October 2019

http://www.sappma.co.za/images/documents/Press/2019_SAPPMA_AGM_POSTEVENT_PRESS_RELEASE_FINAL.pdf

³ Minutes of the Plastics Chamber Research Briefing, 30 January 2020.

- limited innovation (product) as a vibrant culture of home-grown design is lacking, borne out by the fact that the plastics industry generally is notoriously characterised as being a follower or copier of world trends and market developments,
- low margins and a lack of capital investment promoting technological uptake/ equipment upgrades,
- specialist skills lacking in certain areas,
- management challenges,
- high raw material cost,
- weak economy and policy uncertainty

Super-imposed onto this generally distressed state, characteristic of the plastic pipe manufacturing industry sector's shape of late, are the profound and widespread impacts of the novel corona virus pandemic on the industrial manufacturing sector generally. Some issues that companies in the industrial manufacturing sector may face in this regard include the following:

- Manufacturers will likely face continued downward pressure on demand, production and revenues as the COVID-19 pandemic intensifies. They will also likely face cash-flow liquidity challenges and difficulties in managing debt obligations. Therefore, the industry may see some manufacturers struggle to recover — and even declare bankruptcy — depending on how robust and effective any government intervention and support may be, and how long the COVID-19 crisis lasts.
- The manufacturing industry is especially vulnerable given that the bulk of its workforce is employed in on-site jobs that cannot be done remotely. Additionally, given the nature of the industry, manufacturers will need to consider how to create social distancing in workplaces that are typically worker-dense (e.g., manufacturing plants, warehouses, material movements and logistics, etc.)
- Furthermore, manufacturers need to prepare for major global supply chain disruptions. This will affect not only the OEMs, but will also likely ripple throughout the supply chain, affecting suppliers by driving reduced demand for materials and components. Supply chain partners may experience their own challenges and may not be able to fulfil orders on time. Manufacturers with global supply chains are likely to find that Tier 2 and especially Tier 3 suppliers are most affected by disruptions related to the pandemic. While many large manufacturers have instant online visibility into top-tier suppliers, the challenge grows at lower levels.
- Given the unknown variables of how the COVID-19 pandemic will play out and when containment will be achieved, industrial manufacturers should brace for a trying period and plan for a recovery that may not arrive for at least one year, based on prior crises the industry has experienced.
- The sector will also likely expect a *prolonged reduction in capacity and cost structure*, which may translate into possible staff reductions and related measures, as economic activity and commercial aviation decline.

- Considering the widening outbreaks of COVID-19 affecting their workers, companies may need to *outsource some corporate functions* (e.g., moving IT to the cloud or shifting internal non-core operating functions to contractors). Such changes can reduce operating costs and eliminate maintenance capital.
- The industry will likely move quickly to cut discretionary and capital spending to support operations. A key question for all companies will be: ‘Do you have the financial reserves to weather the storm – or potentially to capitalize on the tumult in the industry?’
- Disruption in the sector is expected to lead to numerous financial disclosure implications. Stakeholders are making it clear that they expect transparency from companies and disclosures about actual and anticipated impacts, and, most important, the risks and vulnerabilities to the business.
- As manufacturers respond to and plan for changes to supply chains and workforce global mobility due to COVID-19, each of these changes will require careful consideration of potential tax implications.
- Multinational companies should expect potential cash-flow constraints from overseas operations, including cash repatriation complications and irregularities. Cash could also be bottlenecked when goods are purchased but not supplied (or delayed and stranded). Such cash bottlenecks will likely occur in regions most affected by COVID-19.

Containment / rescue measures by governments⁴

The roll-out of extended lockdown and social distancing policies or regulations curtailing economic and social activity that thus far has characterised the primary initial response by governments across the globe to contain the novel corona virus pandemic, have in effect started a ‘ticking clock for structural economic damage’. Whereas a two- to three-week period of heavy mitigation would likely result in ‘minor, permanent economic harm, akin to a short power blackout’, the spread of structural damage, including defaults and business failures, is likely to accelerate sharply in instances where such policies that are maintained for longer than one month.

Remedial fiscal policy response to date has primarily consisted of either true emergency measures—like ensuring citizens have the cash to buy groceries—or fiscal stimulus consistent with fighting a typical business-cycle recession, albeit at an unprecedented size and scale. Each country has a slightly different approach, but to date no nation has implemented a comprehensive strategy to assure solvency, such as some sort of ‘modified catastrophic-insurance approach’. However, regardless of size, the existing policies are not deemed well-calibrated to the scope of the business interruptions resulting from the pandemic as traditional, after-the-fact stimulus likely will not be capable of containing and moderating that type of shock to a country’s economic structure. Barring a significant change in governments’ models for backstopping their respective economies, a global recession that is worse than the Great Recession is now the upper bound.

⁴ Harris, K. (April, 2020) *Tracking the global impact of the coronavirus outbreak*. Bain Macro Trends Group. <https://www.bain.com/insights/tracking-the-global-impact-of-the-coronavirus-outbreak-snap-chart/>

What to Expect After the Pandemic?⁵

- Markets will eventually settle into a new, post-pandemic normal, which will only partially resemble the world we are used to know. In fact, there will be closer reliance on local markets and probably worldwide trade disruption.
- Manufacturing will possibly be based on smaller market pockets and shorter value chains. In this environment, companies will have to reconsider their supply chain footprint and transform their operations to make them fit for purpose and ready for the next disruption.
- Many new initiatives will be introduced in this new phase but it's impossible to figure out how exactly companies will drive their way to success, at least for now.
- The pandemic is expected to heavily disrupt both the demand behaviour as well as the supply and capability of companies to deliver goods to the market. This will require a complete new set of skills centred on having higher operational agility and leveraging real-time demand intelligence and process visibility.
- Manufacturers can expect to enter a new era of closer public-private coordination in order to strike the right balance between producing critical products and protecting public health.
- Finally, the pandemic will trigger a new sense of urgency for manufacturers to strengthen their businesses through digitisation.

1.2 Design and methodology

1.2.1 Design

In view of the above, the Plastics Chamber, pre the Covid-19 pandemic, requested that research be undertaken to understand the challenges in the plastic pipe industry sector and to make recommendations to improve the current negative position the industry sector finds itself in. During the course of the research the emergence of Covid-19 exacerbated umpteenth-fold the impact on manufacturing and as such was an extension to the initial problem statement.

Towards this end the research *objectives* are to:

- Establish a baseline picture of the challenges facing the plastic pipe sector value chain.
- Present a “futures” understanding of what can be optimised in the value chain to improve sector performance.
- Determine the current skills shortages, education and training provision and shortfalls.
- Establish what current R&D facilities contribute to improve the situation and what the best mechanisms would be for aligning industry and research efforts.
- Make recommendations on future (support) interventions to improve the situation.

⁵ Jan Burian, J., Slowik, M. & and Veronesi, L. (18 March 2020) *How the coronavirus outbreak is impacting the manufacturing industry*. IDC Manufacturing Insights. <https://blog-idcuk.com/coronavirus-outbreak-impacting-manufacturing-industry/>

In this regard, the corresponding overall research question that frames the study's focus, in a two-dimensional way, is as follows: *“What can be done to improve the competitiveness of the plastic pipe sector, with reference to both pre-and post-novel corona pandemic contexts?”*

The study focus specificity is extended through the following *sub-questions or themes*:

- How can the value chain in plastic pipe manufacturing and installation be optimised to better meet the supply and demand dynamics of the sector, bearing in mind the constraints of public procurement of plastic pipes?
- What improved quality management systems will assist in streamlining processes and procedures in the sector from design to installation and end user?
- Can the sector diversify product offerings outside of the construction and mining sectors?
- What are the specialised skills required by the plastics pipe sector?
- Is there a shortfall/deficiency in education provision and, if so, what needs to be done to address the problem?
- What mechanisms can be instituted to optimise existing R&D facilities and add value towards more market pull?

Questions concerning the *impact of the novel corona virus pandemic* on the plastic pipe manufacturing industry sector (company level) and what strategies and practices would enable pipe manufacturers to successfully cope (or not) with the crisis and its impact in the short to medium to long term (the ‘new normal’) were addressed as a transversal or cross-cutting theme layered onto the investigative framework.

These include a focus on;

- How are companies responding to the crisis?
- What steps are taken for survival of the business?
- Where does company agility come from and how quickly do businesses get back on a stable footing?
- What has differentiated South Africa's responses to the crisis?
- What are the macro, micro and systemic issues that have affected company strategies and practices?

1.2.2 Data collection and analysis

➤ Data collection

A fit-for-research-purpose/focus qualitative methodological approach was adopted in view of the requirements for rich and nuanced empirical data to inform the descriptive and analytical/tasks for producing the stated deliverables or outputs. The theoretical/conceptual underpinnings of investigative and analytical frameworks to guide the study were derived from a review of relevant literature and guidelines put forward by the Plastics Chamber research task team in a scoping workshop held on the 30th of January 2020.

The study focuses on the differences between small, medium and large companies as well as a current and futures approach to develop implementable recommendations for the Plastics Chamber. Extensive engagement with the South African Plastic Pipe Manufacturers Association (SAPPMA) was seen as vital to accessing the key people in the industry for research purposes.

Data collection commenced in July 2020 and letters of invitation were sent to 45 participants, of which 35 indicated their willingness to participate. The sub-sectoral breakdown of the sample set included manufacturers, installers, engineering firms, polymer manufacturers, suppliers, construction companies, R&D institutions, and end-users.

Due to the restrictions of the Covid pandemic at the time, it was initially decided to collect data via an electronic questionnaire survey. Email and telephonic follow-ups were done to increase survey participation but as of 6 October 2020, only 7 participants had completed the survey. The survey fatigue was strong with reasons cited including:

- Busy work schedules
- Not interested and having more pressing matters to deal with
- Covid 19 issues affecting the company
- Reluctant to complete electronic surveys and rather opting for face-to-face interviews
- Complaints about generic issues and declining to participate

With the easing of Covid hard lockdown restrictions and subsequent opening up of inter-provincial travel, a target was set for 15 face-to-face or online virtual interviews with industry and by the end of 2020, 14 interviews were conducted. This allowed for survey data clarification, supplementation and enrichment on a selective basis.

A semi-structured interview methodology was employed to encourage a conversational approach. Everyone was informed of the ethical consideration and given an opportunity to ask questions. All the interviews were recorded and transcribed verbatim.

During the course of the data collection, the vital role that municipalities play in supporting the plastic pipe manufacturing sector was recognised and a further 4 interviews were conducted with municipal representatives early in 2021, following the same approach employed for the industry interviews.

➤ **Data analysis**

Qualitative data analysis is the process of moving from data (primary or secondary) to evidence-based interpretations and, eventually, to findings. The challenge of qualitative data analysis is therefore enormous and represents an onerous task – to make meaning of volumes of empirical data through rigorous analysis and then to communicate the essence of what the data reveals in a clear and unambiguous manner.

The first step in the analysis was “coding”. This involves firstly allocating a summative phrase, sentence or word for data portions or segments in the interview transcripts to adequately capture the data’s primary content/meaning. This first cycle of coding is closely linked to the key research questions of the study. The second cycle of coding further filtered and highlighted aspects of the qualitative data. In this process categories, themes and concepts emerge from the data itself. In some instances, the codes are broken down in further sub-segments to give a more nuanced and detailed representation of the data. Natural and deliberate patterns

emerge from the coding activity to eventually explicate the key findings of the study along a thematic basis.

1.2.3 Sample description

A total of 7 industry representatives completed the electronic survey and a further 14 interviews were conducted, giving a sample size of 21. Four municipality representatives were interviewed, increasing the total sample size to 25.

Table 1: Geographical spread of industry interview participants & size of enterprise

Provincial distribution	Total	Enterprise size	Total
Gauteng	14	Large	8
KwaZulu-Natal	2	Medium	7
Mpumalanga	2	Small	6
Western Cape	3	TOTAL	21
TOTAL	21		

Table 2: Job titles of interview participants

Respondent Designation					
Industry					
1.	Head of Engineering Products	8.	Production Manager	15.	CEO
2.	National Sales Manager	9.	CEO	16.	Managing Director
3.	Founder / Owner	10.	Founder	17.	Technical Manager
4.	Product Manager	11.	CEO	18.	Factory Manager
5.	Managing Director	12.	Commercial Executive	19.	Founder / Owner
6.	Research Group Leader	13.	CEO	20.	Technical Director
7.	Sales Manager	14.	Technical Manager	21.	Market Analyst
Local government					
22	Head: Planning, Design & Projects – Reticulation				
23	Design Manager for Water & Sanitation				
24	Functional Head: Utility Services Department, Water and Sanitation Division				
25	Deputy Director: Sanitation Services Technical Investigation and Design Management				

2. Key findings: Industry dynamics & issues

2.1 Micro (company) level

NOTE: Perspectives on a range of sector-related concerns, constraints and challenges are for the most part the view of industry respondents. That is, with the exception of one sub-section dedicated to the relationship between industry and government. This sub-section focuses on government as an influencer of industry fortunes by virtue of policies, strategies and associated interventions and as a critical end-user of industry products and services.

2.1.1 Leadership issue

SPECIFIC FINDING 1:

Non-industry-savvy leadership a recipe for ruin

- *Lacking a nuanced, 'nitty-gritty' understanding of the market and organisational / operational dynamics*

Manufacturing respondents highlighted that non-industry-savvy leadership is a recipe for ruin. There is a need for a nuanced, 'nitty-gritty' understanding of technical and manufacturing issues, as well as market and organisational/operational dynamics. It was felt that when "traders" or "financial guys" start running the business, incorrect decisions start to be made. For example, a company's stock was reduced to a minimum in order not to carry excess 'dead weight'. This proved disastrous from a supply perspective for the company cited. Knowing the fundamentals of stock management and knowing how to read the market were highlighted as leadership imperatives. It was felt that "finance guys" lack this knowledge and have a more generic "big picture focus" which does not serve as good leadership in the manufacturing sector.

Within industry itself leadership is a problem. We've seen most of the big players go bankrupt in the last few years. And the reason why this happened is because they were owned by these big groups who are traders – they are not savvy and skilled enough to make the right decisions for the pipe industry because they're not into manufacturing at all. (Founder, Company I)

2.1.2 Staff issues

SPECIFIC FINDING 2

'New generation' staff members displaying lack in loyalty and commitment to the company, with attendant impact on company including:

- *There is a negative return on investment in human resources development terms considering the intensive induction and training (products and market dynamics) job entrants undergo;*
- *Disruption to company functioning and stability;*
- *A reduction in work ethic and staff morale;*
- *Companies gaining a bad reputation for high staff turnover*

As with other sectors, the plastic pipe industry feel that 'new generation' staff members lack loyalty and commitment to the company. They bemoaned the reported pervasive trend of new staff who, after receiving intensive induction and training on products and market dynamics, resign after six months or so in pursuit of higher salaries elsewhere. This created frustration for owners and senior management and is viewed as a significant 'disrupter' to company functioning and stability, as well earning the company a bad reputation for high staff turnover. Another respondent also cited a reduction in work ethic and staff morale and its impact on company 'return on investment'.

2.1.3 Business (model) sustainability issue

SPECIFIC FINDING 3

Greed as main enemy to sustainability

- *Existing (market-dominating) companies –*
In their quest to secure dominance in a particular product market, companies eventually fail because of unsustainable business models and income streams with respect to that particular product
- *New entrants to the market –*
In their quest to 'get rich quick', new entrants to the market fall foul of charging too-high prices for products and services at the outset. They are critiqued for not being prepared to first grow their businesses into the kind of prices they're charging at the outset. Consequently, they fail by way of pricing themselves out of the market.

Closely related to the leadership finding above, respondents felt that market greed was the enemy to a sustainable business – that in their quest to secure market dominance on a particular product, existing businesses create unsustainable business models and income streams which lead to their demise. This greed and arrogance to get a larger and larger portion of the market results in them getting too big and eventually pricing themselves out of the market. It was felt that it is better to remain small, lean and flexible and be prepared to adjust profit margins as market circumstances require.

The reason why so many companies went under in recent years is because they got too greedy, if not arrogant, which resulted in them getting too big as organisations and therefore needing a bigger and bigger slice of the specific product market in which they became entrenched (market dominance). (Founder-Owner, Company N)

For new entrants into manufacturing, there was also a critique of over-pricing at the outset and a lack of patience and understanding about growing their companies slowly.

Then you have your new entrants to the market who want to get rich overnight, instead of being prepared to first grow their businesses into the kind of prices they're charging at the outset. (ibid.)

2.1.4 Organisational development issue

SPECIFIC FINDING 4

Growth dilemma: 'too big to be small but too small to be big – a dangerous place to be'

- *A 'Too small to be big but too big to be small' dilemma arises when companies cannot sufficiently offset the increase in overheads that accompanies company growth (specifically purpose-built machinery acquisition) to be able to compete with bigger players*

A related theme emerged in relation to organisational growth; that is, reference to a dilemma faced when ...'You have become too big to be small but you are still too small to be big, which is a dangerous place to be'. Whilst there was critique of large companies becoming too greedy and outpricing themselves, there was also a recognition that as a company grows there are concomitant increases in overheads but often insufficient resources to compete with bigger players, in the case of purpose-built-machine usage in particular.

2.1.5 Quality management / control

SPECIFIC FINDING 5

Culture and measures

- *There is positive sentiment regarding quality management and companies report having come a long way with respect to quality assurance and associated adherence to norms and standards.*
- *Companies reported SAPPMA membership and unannounced audits comprise a significant contributing factor.*

Within companies, there was a positive sentiment regarding quality management and companies reported having come a long way with respect to quality assurance and associated adherence to norms and standards. At a market-leading company, the quality assurance function is further extended by way of the quality control (QC) department comprising production line-specific or dedicated QC teams that rigorously inspect all products for adherence to norms and standards before being dispatched.

With higher levels of compliance and adherence to SABS/SATAS/SAPPMA standards, they report far fewer complaints from clients. SAPPMA membership and auditing were credited as significant contributors to improved quality management.

2.2. MACRO level (sector & beyond)

2.2.1 Pipe-making

SPECIFIC FINDING 6

Pipe-making as life-giving/enhancing endeavour

- *As a conduit for the distribution of water, as a source of life, pipe-making is viewed as a unique and rewarding manufacturing endeavour.*

Pipe as a conduit for the distribution of water, as a source of life, is seen as making pipe-making unique and rewarding. Water reticulation is viewed as life-giving and pipe making therefore an enhancing manufacturing endeavour. With the local capabilities for manufacturing, respondents feel there should be no reason or excuse why some communities should have to collect water from a stream or fountain, or borehole with a bucket.

2.2.2 Pipe materials preferences

VIEWS OF INDUSTRY RESPONDENTS

SPECIFIC FINDING 7

In praise of HDPE 'versus' PVC

- *HDPE pipes are viewed as much stronger than PVC equivalents and, correspondingly, boast long, leak-free lifespans;*
- *HDPE is recyclable (at end of lifespan);*
- *PVC requires blending and therefore is seen as a high barrier-to-entry process*
- *Compared to HDPE, PVC is an aggressive material in terms of wear and tear on machinery with attendant escalation in maintenance costs*

Though it is not possible to arrive at a generalised finding based on a limited respondent base, a swell in HDPE 'allegiance' to cross-subsector applications is nevertheless noted.

- HDPE pipe has a much thicker wall and is therefore considered stronger for handling high pressure than its PVC equivalent, with the proviso that virgin material is used in the manufacturing process.
- The long and leak-free life span of HDPE pipes and the fact that they can be recycled at the end of their use for regrind – that is, up to the allowable 10 percent mark.
- As PVC 'cannot handle the sun', pipelines need to be buried.
- Barriers to entry in PVC are considered to be much higher compared to polyolefin due to: (i) the requirements for blending or chemical modification which adds time and cost to its processing, and (ii) being a more aggressive material that puts wear and tear on machinery and results in higher maintenance costs.

With polyolefin you can basically go and buy the pellets and tip it into the machine in your garage and make the pipe... whereas with PVC you now first have to go and blend the material, which is quite an expense. (Production Manager, Company G)

However, this higher barrier to entry is not necessarily perceived as a negative, as a respondent says it means there is ‘less “cheating” in PVC compared to the polyolefin family.

SPECIFIC FINDING 8

Plastic pipe replacing metal (steel) in various applications

- Crushing plants at open-cast (coal) mines –
 - *Steel pipes and chute linings substituted with HDPE equivalents with the result that life times are extended from three weeks to three months*
- Piping systems for bulk water transfer –
 - *Compared to metallic pipes that require mechanical installation involving sophisticated equipment and big machinery, plastic pipes are relatively easy to install (manually) and are essentially maintenance free*
 - *This makes plastic pipe a far better and more user-friendly option, which has enabled a new emerging contractor market (in line with government’s focus on infrastructure devolvement to boost economic growth)*

Historically, pipes and chute linings at crushing plants of mines were fabricated from steel and have to be replaced every three weeks or so due to the effects of corrosion and wear and tear, with an associated disruptive impact on production. One respondent, who has been servicing such crushing plants at various types of mines for a number of years, reflected with great enthusiasm on how these mines are benefitting from replacing the steel pipes and chute linings with HDPE equivalents which boast a lifespan of three months. Additional benefits highlighted were the cost savings derived from recycling of the HDPE pipes at the end of their lifespan for use as regrind – up to the allowable 10 percent mark. The HDPE chute linings make for enhanced coal flow rates into the crushing plant due to diminished friction.

With reference to bulk water distribution (reticulation) networks that require large pipe installations operating under high pressure metallic pipes have traditionally been used. Metal pipes, because of their weight, require mechanical installation involving sophisticated equipment and big machinery. Switching to plastic pipe, by contrast, was lauded as relatively easy to install manually and is essentially maintenance free, which makes it an attractive option both in economic and user-friendliness terms.

SPECIFIC FINDING 9

- *Emerging contractor market as ‘unintended’ consequence of plastic replacing steel in pipe networks*

A significant knock-on effect of this switch to plastic pipe is that it has enabled a *new emerging contractor market* – in line with government’s focus on infrastructure development to boost economic growth.

For this reason they [plastic pipes] are therefore a far better, more user-friendly option – as indeed for the emerging contractors which government has gone out of its way to support... who could not previously compete with the big five or six contracting companies

because of lacking the capital to invest in the sophisticated equipment. (Technical Director, Company 0)

LOCAL GOVERNMENT RESPONDENT PERSPECTIVES

SPECIFIC FINDING 10

Old / existing infrastructure

- *At local government level, preference for the polymer content of pipe by and large stems from pragmatic criteria; that is, sticking with what has served them well over the years with respect to particular applications in water and sanitation contexts whilst introducing alternative polymer when replacing*

With respect to older water and sanitation infrastructure, the material content of piping systems generally spans ductile iron, asbestos, steel, and HDPE. One metro respondent paid tribute to the enduring trustworthiness/ longevity of asbestos and steel pipes (context-specific):

On the water network side, 56% sits with the old material of cement and asbestos pipes and various others such as steel. Asbestos is giving us good service but not everywhere – on the medium sizes, even on sewer side, they actually last quite well... but not so on the very small and the very big diameters on the sewage side. So the asbestos is not letting us down as we anticipated. It is a safe product if it is on the ground and water flowing through it... it's absolutely a 100% product, only the handling and cutting is a problem. (Head of Planning, Design & Projects: Reticulation, Municipality A)

Our steel pipe networks [in relation to big water mains, going up to 500metres pressure] are on full cathodic protection. We have been using steel for years now and I can't see us changing. If a big steel pipeline goes, you can close it down, weld a patch on and you're back in business... you can turn the water back on in a short time. And you can come back later and redo the coating and stuff. (Head of Planning, Design & Projects: Reticulation, Municipality A)

SPECIFIC FINDING 11

Infrastructure upgrade/ replacement and development

- *PVC, 'M' and 'U' variants, together with 'some' HDPE are mainly favoured in respect of smaller to medium diameter lines (water reticulation in particular). By contrast, the use of O-PVC was considered at two municipalities years back but due to high failure rates was discontinued.*

We had some big failures and a whole lot of arguments on this O-PVC. In the one mains line around the 300mm, the pipes were shattering. You would get portions that looked like it had exploded from inside. Usually PVC takes time to split and then normally splits on the top – but it didn't, it would blow out in in different planes and places. It went on to about 30 or 40 failures in 3 months. (Design Manager for Water & Sanitation, Municipality B)

2.2.3 Pipe-making technology & machinery

➤ **Current status**

SPECIFIC FINDING 12

Machinery generally old / outdated, which is bemoaned for setting industry back and disadvantages the local market when compared to global competitors

- *The financial wherewithal to keep up with technology is not within the grasp of the majority in the sector; that only a few players can achieve the economies of scale required to allow for continual investment in top quality equipment.*
- *With the exception of established, high-level players, manufacturing equipment conforms to the following two categories:*
 - (i) *an ‘old crowd’ who run with very old, out-dated machines but don’t have the money to invest in new machines, and*
 - (ii) *those using mainly newer generations Chinese machines that have become more reliable than earlier versions but that still have challenges with power consumption, output volumes and quality*

Reflecting on the current status of pipe-making technology and machinery used in industry, one respondent, reflecting a generally-endorsed perspective, had the following to say:

If you have to do a survey of equipment used in industry you’ll find it’s very far away from state of the art... it’s generally very old and out-dated. (Founder, Company I)

Another respondent (Technical Manager, Company L) typifies pipe manufacturers as broadly falling into two groups (with the exception of established high-level players): (i) an ‘old crowd’ who run with very old, out-dated machines but don’t have the money to invest in new machines, and (ii) those using mainly newer generation Chinese machines that have become more reliable than earlier versions but that still have challenges with power consumption, output volumes and quality because they do not represent the latest technology when compared to European, Japanese and American machines. Additional shortfalls noted relate to after-sales service, language barriers, quibbles around replacement of broken components and machines being supplied with mild steel tooling, unless the purchaser specifies hardened steel, which results in the dye only lasting for six months.

The current industry shortcomings regarding pipe-making and associated technology and equipment use are widely bemoaned for setting industry back and disadvantaging the local market when compared to global competitors. Consequently, an urgent need was voiced for manufacturers to embrace and invest in newer technology and equipment – featuring automation and tolerance control features – that will enable them to produce faster, cheaper (e.g. low power use) and at higher tolerances (quality standard) so as to turn their businesses into more competitive and profitable enterprises.

One case in point of ‘dynamic investment’, as reported on in the April–May 2020 issue of Southern African Polymer Technology magazine (p.18), relates to a company that commissioned a 1200mm solid wall pipe extrusion line from China. The acquisition allowed the manufacturer to increase pipe production from 16–630mm to 500–1200mm at a production rate of 1600 kg/hr. The move to a higher speed machine allows conversion at a faster rate,

reducing the cost per kg and making the company more competitive. In the words of the supplier of Yilli Machinery Africa: ‘Only with an aggressive capitalisation programme in place will a manufacturer continue to be more competitive in the market’.

However, it was generally acknowledged that the financial wherewithal to keep up with technology is not within the grasp of the majority in the sector; that only a few players can achieve the economies of scale required to allow for continual investment in top quality equipment.

SPECIFIC FINDING 13

Imported extrusion machinery/ equipment not aligned to the South African manufacturing environment

- For example, not supporting short runs

The South African industry has a need for technology that supports short runs, unlike developed countries where one extruder can run one pipe size all year long because there is demand for those sizes. A product called QuickSwitch allows changing from one extrusion line into another at a flick of a switch.

There’s a technology called QuickSwitch which allows, at a flick of a button... it’s a push button process, to change one extrusion line into another – from a small diameter to a big diameter pipe, from a small pressure class to a bigger pressure class. (CEO, Company I)

➤ **Developments in pipe-making technology and equipment/ machinery**

SPECIFIC FINDING 14

Electrofusion welding

- South Africa lags behind the rest of the world in using mechanical fittings and not electrofusion welding

Worldwide HDPE and electrofusion welding dominate the water infrastructure industry, whereas in South Africa mechanical fittings and compression are still widely in use. This means there is a skills deficit in this area despite the training provided in-house by IFPA and others.

SPECIFIC FINDING 15

Electronic integrated business management systems

- Enterprise resource planning (ERP) systems are lauded for boosting efficiency – that is, in contrast to high admin-intensive manual processes still widely used.

Enterprise resource planning (ERP) systems are lauded for boosting efficiency – that is, in contrast to high admin-intensive manual processes still widely used.

IT and ERP assistance are critical. Many of my competitors still run very admin-intensive manual processes. I have invested in advanced ERP systems that make a huge difference to the business because technology increases efficiency. (Managing Director, Company E)

SPECIFIC FINDING 16

Nanotechnology and nanostructure additives for improvements in material properties

- *Nanotechnology applications are acknowledged but several factors inhibit their development and uptake.*

Whilst the potential usefulness of nanotechnology applications in the plastic pipe sector is acknowledged, factors that currently limit their adoption in industry include the complexity of applications, the fact that standards have not yet been developed and the specialised machinery involved requires particular expertise in regard to maintenance of and modification. Specialised skills will also need to be developed for nanostructure additives, where skills will be needed to develop and characterise (measure) the material.

Nanotechnology is exciting...there are no standards for it yet and it probably has a long way to go still. But it is something that could definitely be useful in the future. The stuff that I've seen increases the properties of the pipe – it's actually quite brilliant but it's not so easy because there's a whole lot of things you have to do and the machinery has to be quite specialised as well so you have to have someone with the know-how to modify and maintain the machinery to run the product. (Technical Manager, Company L)

SPECIFIC FINDING 17

3D printing

- *The process is slow regarding product fabrication but for mould making 3D printing offers a significant time saving and is becoming a lot more common.*

Respondents reported that 3D printing is becoming a lot more common, both for making parts for machinery as well as for making moulds. For product fabrication, the process is slow, but for mould-making 3D printing offers a significant time saving with respondents quoting seven days for a 3D printed mould compared to twelve weeks fabrication time when the mould is made out of steel.

SPECIFIC FINDING 18

Robotics

- *Opportunities await...*

Internationally robotics are focused on sorting and packing pipes and there is an opportunity for South Africa to explore this technology.

SPECIFIC FINDING 19

Information Technology and Communication (ITC)

- *Tablets and iPads are still not widely used in the industry, but offer solutions.*
- *Android and Apple applications also have potential throughout the value chain from manufacturer to sale and installation*

Tablets and iPads are still not widely used in the industry, but they have great application for quality control by roaming inspectors working on the production line. With this technology the data captured can automatically be stored in the cloud, from where it can be accessed and analysed.

He would have a template on his tablet which he fills in his quality data which will automatically be stored in the cloud, which is what we are using. From there it can be analysed. But this you don't really see in industry... reams and reams of paper still used. So the technology is there, it just needs to be embraced. (Respondent 17, Technical Manager, Company L)

Android and Apple apps could potentially be used at point of sale to instantly access a certificate of conformance for a pipe or fitting where the relevant information for each pipe is stored in the cloud. It was suggested by a respondent that this app development would be relatively simple and the relevant storage in the cloud could be developed and stored in the cloud collectively by SAPPMA and Plastics SA.

2.2.4 Raw material issues and dynamics

SPECIFIC FINDING 20

Covid-19 impact

- *The disruption of the raw material supply has been substantial, and shortages and delays are now a general problem, which was not the case in pre-Covid times.*
- *Currently overseas sourced material is very expensive for a number of reasons, including exchanges rates, high local demand and disruptions in the oil production sector.*

The initial world-wide Covid lockdown saw a major drop in raw material demand and a commensurate drop in oil price and consequently a drop in ethylene production in the East. By extension, the same happened with SAFRIPOL in South Africa when production was reduced.

Currently it is not possible to have any real perspective on supply and demand for the reason that there's so much uncertainty... for the last two weeks I've been sitting with this worry about what is going to happen in this industry. (Sales Manager, Company F)

The disruption of the raw material supply has been substantial, and shortages and delays are now a general problem which was not the case in pre-Covid time.

We recently had an incident where the container was eight weeks late. So if you think about the stock holding that you have to do if you think the container is going to be here

this week, only for it to arrive in two months' time. You will run out of material. (Managing Director, Company L)

Of course now with raw material demand picking up all over, the importers struggle with shipping delays because of huge backlogs. (Respondent 7, Sales Manager, Company F)

Currently overseas sourced material is very expensive for a number of reasons, including exchanges rates, high local demand and disruptions in the oil production sector.

SPECIFIC FINDING 21

SAFRIPOL

- *Certain respondents felt that SAFRIPOL plays an unfair pricing game, which creates imbalances in the supply chain – i.e., waiting for the importers prices to become available and then adjusting prices to just below the imported price.*
- *Conversely, SAFRIPOL is hailed as world-class and their engineers and expertise are lauded, particularly for materials development.*

Certain respondents felt that SAFRIPOL plays an unfair pricing game and can produce at a cheaper rate than imported material. They report SAFRIPOL refusing to give a price two to three months in advance, because they are waiting for the importers prices to become available and then they adjust their prices to just below the imported price. This creates imbalances in the supply chain, either disadvantaging industry or SAFRIPOL depending on the outcome of the hedging.

Other respondents feel that SAFRIPOL is world-class and their engineers and expertise are lauded, particularly for materials development.

SPECIFIC FINDING 22

Materials development

- *Very limited materials development*

Locally there is very little materials development happening and basically the industry is only copying new developments from overseas.

Development in materials happens all the time, like, you now don't only get HDPE, you also get SD1000 which is rock-hard and used for impact. They're doing wonderful things, especially when it comes to high pressure lines. BUT locally there isn't much happening... (Founder/ Owner, Company N)

2.2.5 Quality standards development and regulation

➤ **Manufacturing**

SPECIFIC FINDING 23

Industry bodies and national standards development and certification

- *‘Very active’ industry bodies are hailed for promoting responsible manufacturing and work closely with SABS and SANAS as well as civil engineers and the construction industry*
- *SAPPMA in particular is credited for playing a leading role in trying to improve on the standards and for stepping into the ‘quality breach’ due to SABS ineffectiveness in quality assuring*
- *The work of Plastics SA was also lauded, particularly their training initiatives*
- *SATAS certification is preferred to SABS certification due to its better reputation for upholding standards*
- *The Installers Federation of South Africa (IFSA) is viewed as less experienced in fulfilling its mandate with respect to training provision*
- *Not everyone views accreditation in a positive light, with some perceiving it as a ‘money-making business’. Some feel certificates are issued without sufficient testing, some of which cannot even be done locally*
- *The lack standards for gas pipe manufacturing is bemoaned*

National standards are developed and revised through the South African Bureau of Standards (SABS) Technical Committees. In this regard, SAPPMA is credited for playing a leading role in ‘trying to improve on the standards all the time’ (Respondent 17, Technical Manager, Company L). However, respondents felt that the SABS standards are ineffective due to poor regulation.

As a plastics industry we’re just trying to do things ourselves when faced with hurdles, like the time of the issues with the SABS. Talking of the SABS – I believe it is good to have competition in the market. The SABS used to be the one and only till about 2015 but now have a bit of competition in the form of SATAS, the BSI (British Standards Institute) and so forth. This is going to keep the SABS honest – they’re now going to have to work for their clients. (Technical Manager, Company L)

The plastic pipe industry respondents feel there are very active industry bodies which promote responsible manufacturing and work closely with SABS and SANAS as well as civil engineers and the construction industry. The work of Plastics SA was also lauded, particularly their training initiatives.

SAPPMA is seen as playing an important role in the industry. Due to SABS ineffectiveness in quality assuring, SAPPMA has stepped into the “quality breach” and by taking membership of SAPPMA, companies are audited and given accreditation. SAPPMA membership is also a requirement when tendering for work in the mining sector.

Not everyone views accreditation in a positive light, with some viewing it as a ‘money-making business’. Some feel certificates are issued without sufficient testing, some of which cannot even be done locally. There was also a critique of no current standards for gas pipe manufacturing.

Despite negative perceptions, SATAS certification is preferred to SABS certification due to its better reputation for upholding standards.

That's why most of us big players in industry belong to SATAS for certification because we believe in the standards they uphold, in contrast to the SABS. We had a contract with SASOL and in all the years their quality is of the best and they came to us and said: 'We are not happy with..., we've lost confidence in the SANS 4427⁶ standard, you must adopt the German standard'. So we then had to get the DIN certification. (Sales Manager, Company F)

The Installers Federation of South Africa (IFSA) is viewed as less experienced in fulfilling its mandate with respect to training provision. The Installation of Fabrication Plastics Pipe Association (IFPA)⁷ is another entity that certifies plastic welders every two years.

➤ **Installation**

SPECIFIC FINDING 24

Quality management/ control as superficial compliance or a rubber-stamping exercise

- *On-site quality controllers are fingered for lacking basic plastic pipe related knowledge and awareness*
- *Clients, engineers and contractors are castigated for 'superficial compliance' and treating quality control as a 'rubber-stamping exercise', for example, abiding by 'generic ISO 9000 paperwork' as opposed to asking for things like detailed Certificates of Authenticity (CoA)*
- *Ultimately there is appreciation that quality control shortcomings are not about the quality management systems per se but rather about the policing of quality by way of inspections. Inspectors need to receive the appropriate training so as to guarantee that 'what goes into the ground is what was specified as per design'*

On-site quality controllers are fingered for lacking in basic plastic pipe-related knowledge and awareness, which results in, among other things, signing off on pipe deliveries and then it is only later discovered that, for example, pipes are undersized, out of shape (have become oval due to improper stacking practices) or 'flats spots' have developed on the length of the pipe, as opposed to only the ends, which compromises the pressure capacity of the pipes.

However, ultimate responsibility for a project's implementation and associated quality control protocols is apportioned to the resident or on-site engineer. A respondent with a wealth of experience in piping systems design for various sectors reflects as follows:

From a design point of view I assume the contractor is going to put an appropriately certified product in the ground. Whether this is the case ultimately depends on the Resident Engineer whose responsibility it is to conduct a detailed on-site inspection of the products and sign off if satisfied. To what extent such quality control measures happen in cases of smaller companies, I won't know... though I have some misgivings. (Technical Director, Company 0)

⁶ Regulatory standard for plastics piping systems for water supply, drainage and sewerage under pressure www.iso.org/standard/72184.html

⁷ IFPA was formed to expand regulation of the Plastic Pipe Industry in Southern Africa – a SAPPMA initiative.

Respondents reported that in many instances, clients, engineers and contractors 'will ask for generic ISO 9000 paperwork', but very rarely would they ask for things like detailed Certificates of Authenticity (CoA).

... because a lot of times, as a rubber-stamping exercise, the engineer, or contractor, or client will just require you to complete the paper work. They would say: I'm buying these pipes from you for this project, I need a copy of your ISO 9000 or 4500 certificates. But on very few occasions will they actually ask for things like a detailed Certificate of Authenticity. (Technical Manager, Company L)

Additionally, it is felt that it is not so much about the quality management systems but rather about the policing of quality by way of inspections, provided inspectors receive the appropriate training.

Over and above compromised product quality, delivery and installation also suffers from quality management and control shortfalls. This invariably provides a recipe for a 'blame game' amongst value chain constituencies, for example, strife between pipe manufacturers and fittings suppliers when 'things don't add up' at the point of installation.

You get on site to do electro-fusion welding of 800, 900 and 100mm pipe couplers only to find the pipes supplied are 765mm in diameter, that is undersized to the tune of 35mm in spite of ISO 4227 standard specifications ... pipe manufacturer refuses liability claiming they appointed a third party quality controller who signed off on the pipes. So you end up with a situation of R1.3m worth of pipes rendered useless because the couplers couldn't be used as a result of being undersized. (National Sales Manager, Company B)

This drives home the point that, even though a quality management system or controls may be in place, it does not guarantee that 'what goes into the ground is what was specified as per design with regard to quality of product'.

2.2.6 Business environment challenges

SPECIFIC FINDING 25

Exorbitant costs of doing business

- *High electricity costs exacerbated by non-reliability of supply*
- *Alternative use of emergency generators are unsustainable due to cost*
- *Supplementation by independent power suppliers into the main Eskom grid is welcomed by industry*

High electricity costs are cited as a major inhibitor and industry looks forward to independent power production coming online to potentially bring down the cost of power. Labour costs are also raised as an inhibitor. Comparatively, China is reported as being fifty percent cheaper than manufacturing locally.

The rising cost of electricity mentioned above is exacerbated by non-reliability of supply. Two hours of unscheduled load-shedding costs eight hours in the production of PVC pipes due to the need for stripping and cleaning extruders.

With PVC, if the machine goes down, it starts forming something like glass in the extruder. You then have to strip the extruder and chip out all this material – you can't just heat the machine up and push the material out. As for re-heating the machines to the right temperature, keep in mind our big machine is eight tonnes of metal... (CEO, Company K)

With scheduled load-shedding it is possible to run a purging compound through the machine before you stop it but it results in extensive downtime and the machine must be purged of material which is scrap and only good for recycling.

Alternative uses of emergency generators are unsustainable due to cost.

We used to run generators but the generators plus the battery packs cost the company R50m to install and then it used 200 litres of diesel per hour. So it's not really viable in the long term. (Technical Manager, Company L)

Supplementation by independent power suppliers into the main Eskom grid is welcomed by industry.

At the moment the power supply is stable but remains a concern although I hear Eskom is considering dealing with the private power supply companies, which is very encouraging. That would be a significant remedial change. (Technical Manager, Company L)

SPECIFIC FINDING 26

Organised labour issues

- *Organised labour issues with respect to pay and strike action are problematic*

Industry feels organised labour rates of pay do not sufficiently take into account what the market is prepared to pay for a product. Industrial strike action also leads to prolonged production interruptions which cost companies.

SPECIFIC FINDING 27

Racism as inhibiting factor to sector entry

- *People of colour so not feel welcome in the industry, which comprises a significant obstacle for fledgling black owned businesses*

New black entrants into the industry feel that the pipe manufacturing sector is controlled by 'the old guard' who protect their market share jealously and do not welcome people of colour into the industry. This creates a significant obstacle for fledgling black owned businesses.

2.2.7 Government sector

➤ *Strategies and interventions*

SPECIFIC FINDING 28

SME mentoring initiative

- *The mining industry mentoring model for SMEs is lauded as a positive intervention aimed at upskilling and supporting new small companies*

The mining industry mentoring model for SMEs is viewed as a positive intervention aimed at upskilling and supporting new small companies. Contracts are tied to mentorship and they also assist companies with their BBBEE status.

At the bigger mines they have this programme for new, small companies – basically about them getting to understand how things work and are then allocated small jobs as a start, and provided with support. It is a very good thing. I've mentored quite a few of them – it has become a condition for getting work at the mines and it also counts towards my BEE status. (Founder Owner, Company N)

SPECIFIC FINDING 29

Local content directives

- *Viewed in a positive light*

Some respondents feel very positive about the local production and content regulations and think in the long term it must be supported as it creates employment opportunities and assists with empowerment in the sector.

SPECIFIC FINDING 30

Economic revival through infrastructure development

- *As slow economic growth impedes infrastructure development exacerbated by a decline in government tenders and a reduction in infrastructure spend*
- *Attendant underlying reasons cited include budget cuts or freezes, backlogs and misappropriated money and corruption.*
- *Industry respondents hold the strong view that government should clear the backlog of infrastructure projects and stimulate the sector by being an effective consumer of its products*

Slow economic growth impedes infrastructure development, which is a key driver in the plastic pipe industry. A decline in government tenders, reflecting a reduction in infrastructure spend, is widely fingered as a critical contributing factor to the distress the industry finds itself in, as 'comparatively' captured in the following respondent statement:

Government tenders for infrastructure development are lacking sorely in this country. Whereas years ago there would maybe be ten or so contractors at a site meeting for a tender, these days it could be anywhere between fifty and a hundred. (CEO, Company K)

Attendant underlying reasons cited include budget cuts or freezes, backlogs and misappropriated money and corruption. Some respondents are of the view that the decline in government tenders has been a contributing factor to previously large market-dominating companies getting into financial trouble.

Correspondingly, industry respondents hold the strong view that government should clear the backlog of infrastructure projects and stimulate the sector by being an effective consumer of its products rather than strangling manufacturing with procurement issues. It is felt that if government played their part then industry would respond accordingly with quality products and installation. However, it is noted that the number of companies tendering for pipe projects has grown tenfold in recent years and there are concerns about quality assurance.

➤ ***Municipal water and sanitation piping systems***

INDUSTRY RESPONDENT PERSPECTIVES

SPECIFIC FINDING 31

Generally sad state of infrastructure in the face of overwhelming demand for water and sanitation services

- *Tension in priorities between developing new infrastructure and maintaining and repairing the old water reticulation systems*
- *'Huge' project backlogs bedevilling critical water and sanitation services delivery*
- *Lack of basic plastic pipe (systems) related knowledge and awareness across all levels of municipal functionaries*
- *Shortfalls at the level of planning or prioritising and overseeing work due to insufficient levels of knowledge and expertise – specifically engineering skills or expertise required for managing the process of repairing or replacing old infrastructure*

Against the backdrop of huge demand for potable water in communities, industry respondents bemoan the generally poor state of South Africa's public water (and sanitation) infrastructure, with particular reference to a reported high incidence rate of backlogs in water and sewerage infrastructure maintenance and development projects – and consequences thereof – as well as disconcertingly high incidence rates of municipal water system leaks. The latter aspect was widely reported in the media in the early stages of the first wave of the novel corona virus pandemic.

You must remember, when many of those pipes were installed fifty or so years ago the landscape was very different and there was much less pressure on the pipe networks and systems – that is, compared to present day pressures on these aged, not-very-well-maintained water reticulation networks and systems and trying to squeeze more out of them than they can handle... as we can see by the alarming increase of failures and resultant water loss. (Technical Director, Company 0)

In the words of a highly concerned and long-time industry player:

There is a huge demand for infrastructure in our industry, first of all, potable water and sewage...but there are such backlogs at municipalities while the demand for potable water is sky high.

So, the whole chain from where work is required till the finished project is a very unhealthy situation and then, in the end, you sit with all kinds of consequences or crises because of lack of water supply. (CEO, Company K)

On top of this tension in terms of priorities between developing new infrastructure and maintaining and repairing the old water reticulation systems compounds the issues.

A major concern for me is that the focus or priority will be on the installation of new pipe networks, which will take the focus away from the critical maintenance and repair work required in respect of existing, ageing networks. It is fast developing into a crisis, actually. (Technical Director, Company O)

The reality of maintenance of systems that were installed fifty years ago is that populations have increased with a concomitant increase in the pressure on water systems, and this leads to failures and significant water losses.

The budgetary implications for municipalities then becomes an increased burden. If twenty percent of potable water is lost from the system, it means an additional twenty percent of water supply must be purified. The argument then stands that expenditure on maintenance is then more cost effective to stem the losses in the first place.

Specifically at issue are projects that have 'already been designed and gone through feasibility but they then cannot be implemented because for one reason or another budgeted monies are not 'available'. Perspectives on why this is the case range from 'misguided' political priorities as regards municipal expenditure, to corruption in one form or another, particularly with respect to tendering and procurement.

I think it's probably also a consequence of the kind of skills breakdown or lack of competence that we've had in the municipal sectors – people who buy the pipes [lacking in awareness], people who got the contracts... and corruption and all those kinds of malaise that go with it, you know, that have basically negatively affected the sector. (Founder, Company I)

SPECIFIC FINDING 32

Where things are perceived to go wrong

- *Skills and expertise shortfalls*
- *Tender processes/ criteria and skills are often too narrow as to be limiting*
- *Bills of Quantities lack specificity*
- *Contractor expertise and experience outweighed by pricing as primary tender evaluation consideration*
- *Pervasively entrenched corrupt tender / procurement practices*

Skills and expertise shortfalls

It was noted that most municipalities reportedly employ contractors for water and sanitation related project installation or maintenance/repair work. However, where things reportedly appear go wrong is at the level of planning or prioritising and overseeing work due to insufficient levels of knowledge and expertise – specifically engineering skills or expertise required for managing the process of repairing or replacing old infrastructure.

Various instances were referenced of city or town engineers that are underqualified and also not professionally-registered with the engineering council of South Africa (ECSA). In addition, the Department of Water Affairs and Sanitation comes in for criticism for not fulfilling its mandated oversight and support role to municipalities.

Tender processes/criteria and skills are often too narrow as to be limiting

The writing and processing of tenders is also criticised, both from the skill level in designing the tender, as well as the evaluation of the tenders. When industry may like to add value to a project through their technical knowledge and expertise, there is little flexibility to offer unique solutions and efficiencies.

Engineers and consultants are critiqued for not preparing bills of quantities in sufficient detail. This leads to uncertainty when quoting especially with HDPE and PVC pipes and if not interpreted correctly, leads to conflict upon delivery.

Contractor expertise and experience outweighed by pricing as the primary tender evaluation consideration

In previous years, ECSA stipulated engineering fees based on a percentage of the construction project value and there was no debate about the fees. As industry has abandoned the ECSA project-specific fee scales, the tender evaluation process now includes a debate on which is the best team to do the work based on the expertise and experience of team members and their track record of similar projects successfully completed. The fee scale gave a level of surety about the competence of the bidder.

This creates an unlevelled playing field in tender evaluation:

However, these days it's become purely a matter of 'Which tender is cheapest?' So what happens now is that someone like us, a huge international company with 2,000 employees, competes with a guy working from his garage with a staff of five. We obviously cannot compete with this guy, even if we were to offer fifty percent discount... though this isn't allowed in terms of ECSA regulations. They don't have the overheads or the expertise, nor do they have access to networks in order to pull in (specialised) expertise when required. This is where many of projects fail because in these instances there is hardly, if at all, on-site quality control in place – they just accept anything because they don't know better or the difference. (Respondent 20, Technical Director, Company 0)

Respondents strongly feel that skills and competence should be the criteria for tender allocation because it is the only way of guaranteeing that what goes into the ground is of the standard and specifications as designed or intended. This in turn determines how long that infrastructure will last. This raises the complexity of well-resourced larger companies versus new entrants in the market who are less resourced.

I've been to jobs just completed by someone working from a garage – it wasn't properly commissioned, water is running all over the streets... millions wasted because the whole project will have to be re-done. Look, I'm not saying all big companies are necessarily good or perfect – everyone may have slip ups sometime – but at least their expertise is unquestionable. But then also, there isn't room in industry for, say, twenty or so big companies. (Respondent 20, Technical Director, Company O)

Pervasively entrenched corrupt tender/ procurement practices

Corruption in tender processes is widely criticised, from unilateral dropping of quoted prices to the scourge of a 'kick-back' culture that is blatantly requested or negotiated. Bidding prices are leaked to 'preferred' suppliers who undercut and pay kickbacks to get the work. There is an increasing view that 'you have to pay to do business'.

The town engineer approached us – we have done work for them previously – to put in a quote for replacing an old, rotten pipeline from the reservoir to the one township; only to use our quote or budget to negotiate a contract with someone from elsewhere who supplied much cheaper, sub-standard pipes. (Sales Manager, Company F)

I quote three or four clients the same price and then one of them comes back to me and ask if I would give him a better price. I told him, 'no, otherwise I quote against myself... because you will then go to the contractor ... he's already done his tender and submitted his Bill of Quantities, so everything he now saves goes into his pocket... my profit! (Factory Manager, Company M)

Industry respondents feel extremely frustrated having to do business under such conditions, but they highlight that it happens across all sectors and not just at local government level.

The incompetence and corrupt practices at municipal level are attributed to lack of awareness and skill.

'THE GOOD'

There are companies, such as WBHO, that are lauded for their adherence to strict and rigorous quality control criteria and measures as civil industry consultants working on water reticulation projects for new developments. 'You have to jump all the hoops to get work from them' (Sales Manager, Company F). At local government level, the Drakenstein District Municipality in the Western Cape, in particular, came in for praise from far-afield (manufacturers and suppliers) for their commitment to upholding high quality standards and specifications; as articulated by the following respondent:

In our experience, Drakenstein Municipality is so on the ball regarding quality. They have a long-serving, very experienced chief engineer heading their water division who is he's very hard-arsed about quality. I've had some of my pipes (initially) rejected by them because they were over-spec... the prescribed wall thickness of a 630 pipe is between 30 and 35 millimetres but my pipes were of 36 millimetres thickness, which is obviously an even better spec. It is actually wonderful. So I guarantee you they will not do business with any of the corner-cutting companies. (Sales Manager, Company F)

It should be emphasised, as highlighted by industry respondents, that such quality or process management failings are not only a problem at local government level; for example, on-site engineers in the private open-cast mining sector are similarly fingered for project oversight

shortcomings, like not appreciating or understanding of the importance of quality standards compliance.

LOCAL GOVERNMENT RESPONDENT PERSPECTIVES

Government respondents highlighted various statutory and legal provisions when contextualising water and sanitation service provision at local government level, of which a brief overview is presented below.

Water and sanitation service provision at all municipalities is governed by the Water Services Act (Act No. 108 of 1997), which designates a municipality as a water authority (WSA) and its water and sanitation department as a water services provider (WSP). Accordingly, the Water Services Act places a duty on each WSA to prepare and maintain a Water Services Development Plan (WSDP) – also known as a sector plan – every five years, and update it annually in compliance with regulations and guidelines of the National Department of Water and Sanitation. The WSDP integrates technical planning with social, institutional, financial and environmental planning and supports the municipality's Integrated Development Plan (IDP), from which capital and operational budget allocations ultimately derive.

Whilst this water and sanitation services provision framework applies to all local governments in equal measure, the structural and functional organisation of water and sanitation services provision varies significantly across municipalities, with size appearing the differentiator of centralisation versus specialisation.

SPECIFIC FINDING 33

Reasons for water and sanitation systems failure

- *Leaks and pipe bursts are reported as the core reasons for pipeline failure*
- *Poor handling and treatment practices (laying of pipes) and a lack of understanding of pressure on the part of people carrying out the jetting and cleaning of pipes*
- *'Preventable' blockages in sanitation networks*

Leaks and pipe bursts are reported to be the core reasons for pipeline failure, and associated water loss, which is attributed to vulnerabilities in ageing infrastructures, which makes it a preventative maintenance issue and/or a network replacement backlog issue.

However, when it comes to failures in pipes of more recent vintage, one respondent holds the strong view that generally no problems have been experienced with the quality of products sourced from established and reputable manufacturers, the 'Sizabantus and the like.

...'pipe failure most often is about details...attention to the 'little things – very seldom do you actually find the faults or problems are caused by structural issues' (Design Manager for Water & Sanitation, Municipality B).

Accordingly, the main culprits fingered for pipe failure are poor handling and treatment practices (laying of pipes) and a lack of understanding of pressure on the part of people carrying out the jetting and cleaning of pipes.

In the words of the same respondent:

A contractor friend of mine once said, you really have to practise to mess-up laying PVC pipe. And he's right because it's not a difficult pipe to lay – if your bedding is right and your backfill is right and you've pressure-tested your pipe properly, then there is little chance of something that will go wrong. I've seen more pipes put badly in backfill and gone oval than I've seen pipes fail because of a factory fault.

When structural pipes came out our operations people tried to jet them and they failed. We had to throw it back at them and say, 'you are making it fail and you're lucky that the manufacturers don't take you to court for saying their product is rubbish'.

Whilst the above factors also have a bearing on sanitation networks, 'preventable' blockages are viewed as the primary cause of networks becoming compromised. Blockages take up time, expenditure and effort. Remedial strategies and interventions suggested are educational interventions at local community level.

SPECIFIC FINDING 34

Planning for infrastructure maintenance, repair and replacement

- *All (sampled) municipalities subscribe to an information/ intelligence-driven approach and measures in regard to planning for and prioritising infrastructure maintenance, repair and replacement interventions on a systematic basis*
- *However, a range of factors inhibit the proactive implementation of such plans*

All respondents 'enthused' about subscribing to an information/intelligence-driven approach to maintenance/repair and replacement of pipes and/or networks. Comprehensive evaluation systems have been put in place in support of systematised and prioritised interventions, as captured in the following statements.

You can only know what pipe needs to be fixed through the CCTV. But we have many areas where we cannot have the CCTV and therefore won't know what needs to be fixed. In these cases we get information from the depots on what lines have broken down and those that need attention we try to include in the tender. 25

We have enough data and knowledge on the infrastructure for us to know where the problems are and what to fix. We also have got pipe replacement programmes for both water and sanitation with more than enough information on what we want to do it and when we want to do it – prioritised in terms of age and condition of networks or pipes. (ibid)

From a technical perspective we have our systems in place. We have quite an advanced evaluation system for both water and sanitation. We know what and when it has to be replaced. We have problems in terms in capital and human resources. 24

There are 10 attributes that determine the pipe replacement that we try to follow very diligently. (Head of Planning, Design & Projects: Reticulation, Municipality A)

It would appear that, by and large, the designing of sewage networks or systems is outsourced to consultants due to capacity constraints – that is, compared to in-house design of 'less complicated' water systems.

SPECIFIC FINDING 35

Factors inhibiting a proactive response to infrastructure maintenance, repair and replacement priorities

- *Operational budget shortfalls, with critical knock-on effects*
- *Human & physical resources shortfalls*
- *Bureaucratised and cumbersome procurement process*
- *Quality management and control shortcomings*

Operational budget shortfalls, with critical knock-on effects

Funding for maintenance and repair services are allocated funds from operational budget, which derives from rates and taxes on water and sanitation services. In contrast, infrastructure development is funded from the capital expenditure budget. By all accounts, operational budgets fall woefully short and in recent years have indeed seen shrinkage in real terms due to a significant and sustained drop in water consumption as result of water-saving behaviours as a 'permanent' legacy of the severe drought of a few years back, as well as increasing rates of non-payment for water and sanitation services. The fact that metros, by and large, maintained the drought-related high water tariffs reportedly made little impact in off-setting revenue declines.

On the operational or maintenance sides regarding networks, we have got pipe replacement programmes with more than enough information on what we want to do it and when we want to do it. But due to limited budget and resources – whether it's personnel or machinery – which get strained more and more. Because of these factors, preventative maintenance is impossible and we fall further and further behind...not just at this municipality but at all municipalities. (Deputy Director: Sanitation Services Technical Investigation and Design Management, Municipality C)

So, we like not to [have to] replace the network every 50 years – but that means you have to replace two percent of your network every year, which we are not able to do. As much as we want to do more we are limited to R160m per annum, which translates into about 70km a year. But due to the size of the city we have to do much more to get ahead because some of this material in the ground is quite old. (Head of Planning, Design & Projects: Reticulation, Municipality A)

But it was also highlighted that resource shrinkage is also occurring in a relative sense when viewed against the rapid and 'exponential' increase in water and sanitation pipeline and network construction tied to new public housing developments. The water and sanitation department is required to provide the materials, maintenance and repair services, but without correlated increases in its already-stretched resources (budgetary and personnel).

The water operations and the sewage operations budget simply did not increase over the years as the length of pipelines increased almost exponentially with the work that [the] housing [department] was doing. So you have the same number of people and same budget trying to do more and more. (Head: Planning, Design & Projects – Reticulation, Municipality A)

Human & physical resources shortfalls

Critical staff shortages linked to very high percentages of unfilled posts is bemoaned all-round by local government respondents. At one metro this figure reportedly stands at fifty-five percent. A disconcerting contributing factor is that in the case of retirements, funding for these vacated posts is reportedly lost if they are not filled within the financial year. The occupational groupings most affected are plumbers and general workers, the significance of which is exacerbated by the fact that reportedly around 80 percent of wasted water derives from leaks.

The impact of a build-up of emergency repair work backlogs puts relentless pressure on already overworked and stressed out technical personnel and their support staff to improve their response time to leaks and the clearing of backlogs. This situation is a source of huge concern, as highlighted in the following respondent statement.

Our biggest shortcomings are plumbers and labourers or general workers. As a result, we have a huge backlog in terms of physical repairs of leaks and it's relevant to sewage as well. We are falling further and further behind. I think there is more than enough chiefs but we do not have enough people to do the physical work and those people that are available, they are overworked and overstressed. It is too much on their plate. (Deputy Director: Sanitation Services Technical Investigation and Design Management, Municipality C)

One respondent vented frustration for not being able to call on or assemble a full work team as an 'essential condition' for completing a particular job properly, from general workers to the right mix of trade and technical functionaries, to a foreman. Budgetary constraints were referenced as one possible contributing factor to shortfalls in the required personnel. Another contributing factor is a lack of understanding on the part of the human resources department 'to know the team you need... who needs to be in it' (Functional Head, Utility Services Department, Water and Sanitation Division, Municipality C).

Whilst the major shortage in regard to the 'numbers' of currently-employed plumbers is, in the main, attributed to budgetary constraints and the 'hiring politics' – in respect of which an imbalance in favour of management functionaries is bemoaned; loss of operations-related knowledge and skill associated with retirements was also raised as a concern. That is, in reference to a reported general decline in artisan quality due to education and training shortcomings as manifested in the knowledge and experience deficits of their young successors, which are decried... 'Some of them don't even know where the valves and things are' (Design Manager for Water & Sanitation, Municipality B).

As regards the most pressing areas of skills shortfalls, 'good' electrical artisans are reported to be 'as scarce as the electrical engineers' (ibid).

Bureaucratised and cumbersome procurement process that silences technical voices

For most part, as 'correctly' indicated by industry respondents, pipeline construction is for most part outsourced to contractors or consultants; as are certain types of repair work requiring specialised expertise and equipment; that is, due to human and physical resources constraints.

Against the backdrop of the earlier mentioned WSDP which informs the IDP from which, in turn, budgets are derived, the procurement process is initiated with the submission of a Bid

Initiation Form – developed on the basis of a Demand Plan and associated Project Plan – which then has to traverse the following phases: Bid Specification Committee (BSC), Advertising, Tender Meeting, vetting and ranking of bids in regard to technical, eligibility etc. criteria; Bid Evaluation Committee, the Bid Adjudication Committee (BAC). A 21 day appeal period is provided for.

In these regards, corruption mitigating and project specification compliance-enhancing measures tendering/ supply chain processes are lauded but, conversely, a reported trend in recent years concerning the bureaucratisation of tender evaluation processes or protocols is decried in reference to the consequences of the long-winded nature of the process due to ‘excessive controls’.

Local government respondents all-round rued this and personnel has dramatically reduced or minimised the involvement and influence of relevant technical personnel – project managers and engineers – concerning engineering decisions. In this regard, ‘accountant-like’ supply chain management officials are in particular fingered as the main culprits for in recent years having rendered engineers near-voiceless in matters of critical concern to them.

The biggest challenge, I can say, is that the people at the top are not talking to the technical teams that experience everything on the ground – instead, there is a lot of reporting and boxes to be ticked. Previously, the judgement of the technical people was more predominant in the evaluation and awarding of the tender – the project manager and engineer had a huge say because the evaluation was based on price and the technical proposal by the team. But it’s not the main consideration anymore. So, at some of these meetings there is no technical representation. (Deputy Director: Sanitation Services Technical Investigation and Design Management, Municipality C)

The supply chain management people have made themselves like accountants, yet they are running an engineering situation, they are not giving the engineers any real voice, which I think is very poor. (*Design Manager for Water & Sanitation, Municipality B*)

Lengthy tendering / contracting backlogs

When I first started in the municipality here [Municipality B] in 1994, you would do the process and if your tender document was approved by the head, it would then go to the tender board which consisted of a mixture of politicians, market place representatives and senior officials. You would explain yourself there and everyone would question you there and, if there was agreement, you would be passed. It would then take a maximum of three months from the time you put out your advert to the time you were contracting on-site. By the time I left [2019] you were lucky if you made it in nine months... more like 11 to 12 months. (*Design Manager for Water & Sanitation, Municipality B*)

Procurement has its process and it is working, though it has changed a lot over the years. There would from time to time be a *backlog at supply chain* and the tenders would keep building up – you could wait for months or a year before it’s processed. 24

A further factor which reportedly emerged in recent years which contributes to further delays in the procurement process is a high turnover in procurement personnel – in some instances attributed to job rotation – and consequent lack of understand the system/ processes.

Against the backdrop of municipal services departments making extensive use of contractors for carrying out infrastructure replacement or development work, contractor procurement or

selection shortcomings reportedly significantly impact on the quality of work rendered – and indeed on actual project completion. At issue is at times a disconnect between contractor expertise and experience and those jobs or projects requiring the use of specialised construction methods, like trenchless technology. Such jobs, it is felt, should go on open tender as opposed to municipalities being required to select a contractor registered on the Construction Industry Development Board (CIDB) contractor database.

There is huge shortage of work and we need to include as many people as possible but at times it's out of their league and I think it's wrong from us to appoint certain contractors knowing they are a risk and they may not be able to complete the projects successfully. (Deputy Director: Sanitation Services Technical Investigation and Design Management, Municipality C)

Quality management and control shortcomings

Pipeline construction oversight is the responsibility of the resident supervisor/engineer with clerks of works by way of checklists. They are the key functionaries for monitoring task completion as per project-specification and report on such by way of checklists to the resident engineer during weekly and monthly site meetings. In practice, resident supervisors generally are responsible a variety of sites at any one time. [It should be noted that water and sanitation-related construction work – and quality assurance thereof – in respect of housing developments fall under the housing department, although the water and sanitation department carries the responsibility of supplying the requisite materials.]

However, as previously noted, all municipalities to a greater and lesser extent are dependent on contracting consultants for certain types of pipeline construction work, with size and complexity of tasks the main determinants. Whilst in such cases, municipal supervisors and clerks of works are deployed to construction sites, there are too few to go around and consequently consultants also appoint their own such-like functionaries – also bearing in mind major construction projects could involve four to five consultant engineering companies.

Too few oversight personnel – resident supervisors/ engineers and clerks of works – due to perennial human resources constraints.

We found that some contractors start with the best pipe available in the country, the next batch is the worst quality and you don't see it because we do not have the people to supervise the site full-time... so it's not strongly controlled and therefore, before you know it, some strange material has entered the ground. (Head: Planning, Design & Projects – Reticulation, Municipality A)

All respondents readily conceded, to a greater or lesser degree, to shortcomings and failings by their respective departments (water and sanitation) concerning, firstly, product specification. Requirements are not specified in sufficiently clear and unambiguous terms; and, secondly, not having the appropriate measures in place – or, alternatively, oversight personnel lack requisite awareness or knowledge thereof – to ensure the effective quality control of both products received (storeroom and/or on-site) and the installation process. Correspondingly, the quality control function is reduced in scope to no more than mere monitoring of installation steps and 'outputs' in adherence to the project plan, instead of being products/ materials- and 'process' (technical) quality-focused.

One metro respondent succinctly and ‘open-heartedly’ captured these various shortfalls as follows:

We don’t specify clearly in the first place what product is required for the project and we don’t ensure we received the correct batch and standard of pipe on-site because we do not have quality control measures in place. For example, if a pipe arrives and it has a SABS mark on it, it is accepted irrespective of the size.

BUT, it’s not only about the product, it’s also about the installation of the pipes – there are certain requirements for pipes to be installed and the consulting engineer may not always have the capacity to follow all the steps or processes correctly; but we don’t have the adequate knowledge to properly supervise their work. (Deputy Director: Sanitation Services Technical Investigation and Design Management, Municipality C)

SPECIFIC FINDING 36

Cry for help to industry regulatory bodies

- *For a ‘standardised quality control methodology’ to counter exploitation by unscrupulous contractors*

What emerged quite clearly from municipal respondent reflections is a significant degree of ignorance, as acknowledged, concerning the more ‘nuanced’ technical aspects governing quality control of plastic pipe products and their installation – which renders municipalities vulnerable to exploitation by unscrupulous contractors, with failures in water and sanitation systems as end result.

Because of our experiences with pipes bursting, pipes turning black, and so forth because they were clearly not made to standard we have come to realise there are shrewd operators in the market – they can put a stamp on anything, there is no audit... what you get is what you get and we’ve spent the tax payers’ money and it’s not giving us the service. BUT, now remember the store has procured it because it is the cheapest and they haven’t looked at a specification. (Head: Planning, Design & Projects, Reticulation Section, Municipality A)

In this regard, and as legacy of ‘illuminating’ engagements with Ian Venter of SAPPMA, one metro respondent made a plea for the putting in place of a standardised quality control methodology as an easy-to-use reference tool (‘tick-box’) spanning product specification and certification and installation processes.

2.2.8 Competing in the market

SPECIFIC FINDING 37

A shrinking, over-subscribed, low-margins, high-volumes, cut-throat market

- *Low margins were reported as comprising the core characteristic of plastic pipe manufacturing and, accordingly, volume is viewed as the lifeblood of the industry.*
- *20 percent market shrinkage in last five years or so*
- *A dramatic decline in government tenders, reflecting a reduction in infrastructure spend*
- *price (almost) everything*

- *Struggle for survival on the part of new small start-up companies is generally attributed to them all tending to do the same thing in regard to market segment focus*

Low margins were reported as comprising the core characteristic of plastic pipe manufacturing and, accordingly, volume is viewed as the lifeblood of the industry. It would appear from respondent accounts that, in these times, achieving high outputs in and of itself has become a requirement for merely surviving – that is, unlike previous years where it would have guaranteed as a measure for obtaining competitive advantage.

Pipe manufacturing – and I'm talking PVC, HDPE... all the plastic pipes – remains at a very low margin so you don't really make money. You have to sell lots of volume and manufacture specialised stuff in order to make money and stay afloat because the standard sewer pipes, the pressure pipes... everybody does that and the mark-up is extremely low. So it's very difficult for a pipe manufacturer to survive on that. (Technical Manager, Company L)

Last month we had a very good month turnover-wise but when we finalised the figures it emerged that we almost ran at a loss. So you have to chase higher turnovers just to stay afloat. (Sales Manager, Company F)

By the estimate of one respondent, industry is currently only performing at a quarter of its potential... 'it should be producing four times what it is producing currently' (CEO, Company I). Conversely, another respondent puts market shrinkage in the last five years or so at 20 percent.

Up to about 2010–2012 there was a growth factor in industry ... it was about two to three times the GDP, which is the actual market growth of a product. If we look at 2016, let's say our market was worth around 100,000 tonnes of polymer – compared to our current level of around 75 to 80,000 tonnes. So you can say the market has shrunk by no less than twenty percent in the last five years or so. (CEO, Company K)

As noted previously, a dramatic decline in government tenders, reflecting a reduction in infrastructure spend, is widely fingered as a critical contributing factor.

However, generally speaking, some respondents feel that the sector is over-traded and there are (simply) too many players – that is, regardless of current 'circumstantial' market shrinkage.

We find ourselves operating in an over-traded environment in which there are too many players. An argument can be made that, by definition, some of them had to die (with reference to corona virus pandemic impact) in order for the plastic pipe industry to be viable. (Managing Director, Company E)

For example, the fittings market is said to have become extremely cut-throat due to being over-subscribed with regard to the number of suppliers, the majority of whom are acting as agents for Chinese products.

You have to fight for every order because, for example, there are currently 52 suppliers in South Africa for this particular compressor. (National Sales Manager, Company B)

Relatedly, the struggle for survival on the part of new small start-up companies is generally attributed to them all tending to do the same thing in regard to market segment focus.

When new companies start-up they normally stick with small bore pipes, like sewer pipes between 14 and a 100 millimetres. But everybody does that and the margins are extremely low – it's very competitive and there you have to be very careful of your production costs, your material costs and everything else. (Managing Director, Company L)

In all, a generally-endorsed perspective to emerge holds that, in order to survive in these market-depressed times – exacerbated many-fold by the impact of the novel corona virus pandemic – companies are having to re-size, become 'leaner and meaner'.

SPECIFIC FINDING 38

Fundamentals that (ought to) govern competitive pipe-making

- *Producing at the 'highest level of output' so as to ensure sufficient quantity/volume to meet demand at any time;*
- *Producing at the 'highest tolerance levels' to ensure compliance with manufacturing quality standards and product specifications, as proscribed by the industry authorities;*
- *Using as little material as possible, on a 'thinner-but-stronger' basis, so as to enhance production efficiency and cost-effectiveness*
- *(The technological and expertise requirements relating to above aspects are assumed to be in place)*

Against the backdrop of low margins as key market-defining characteristic for plastic pipe manufacturing and, as consequence, volume being considered the essential requirement for surviving in the industry – compounded at this time by circumstantial factors of market shrinkage and over-subscription; what emerged from respondent perspectives as comprising the essentials of competitive pipe-making capability?

One respondent's answer (CEO, Company K), a perspective which could be considered broadly-endorsed, is framed in 'commodity business bottom-line' terms, which dictate adherence to the following two principles: 'Having to be a low-cost producer with volume', which, in turn requires a 'highly cost-effective manufacturing operation'. As materials represent the single biggest cost factor in pipe manufacturing or fittings fabrication, the reduction in polymer content of products accordingly comprises the 'holy grail' in pursuit of producing at lowest-possible-cost whilst at the same time complying with product quality standards and specifications. This quest is succinctly captured in the following respondent statement:

Technologies are therefore constantly looking to reduce the polymer content but the product must still be able to do the job – no different from the beer can. In other words, you go thinner but improve the mechanical strength of the material to use less polymer but still maintain the pressure capabilities of the product. (ibid.)

By these terms, the fundamental production-related requirements to be met so as to ensure market competitiveness could be said to comprise the following:

- 1) producing at the 'highest level of output' so as to ensure sufficient quantity/volume to meet demand at any time;
- 2) producing at the 'highest tolerance levels' to ensure compliance with manufacturing quality standards and product specifications, as proscribed by the industry authorities;

- 3) 'using as little material as possible' on a 'thinner-but-stronger' basis so as to enhance production efficiency and cost-effectiveness
- 4) (the technological and expertise requirements relating to above aspects are assumed to be in place)

It could be further said that, competitive advantage and attendant success in 'getting business' were dependent on successfully combining competitive pricing (due to cost-saving through 'legitimately' reducing materials usage) and product quality (technical/ manufacturing expertise and materials knowledge dependent).

SPECIFIC FINDING 39

'Competitiveness-as-price-war', with sub-standard products and services as 'market underbelly'

- *Production costs and price-cutting through corner-cutting and, ultimately, specification-cutting in relation to materials usage (manipulation of polymer content), for example:*
- *As result, sub-standard non-SANS mark-bearing products enter the market only to fail – and ultimately affecting the credibility of the entire sector*

However, in terms of current market dynamics, competitiveness or competitive advantage has become purely a matter of pricing – or, rather, cost-cutting by producing-on-the-cheap through employing 'corner-cutting' ways for reducing material usage. In this regard, 'innovative' and 'devious' measures reported for circumventing specification adherence for the sake of price-undercutting include the 'exploiting loopholes' by way of slightly under-sizing or reducing wall thickness, adding re-grind beyond the allowable level (in regard to HDPE) or illegally securing a quality assurance stamp on the product.

Ian Venter of SAPPMA indeed drew attention to this corner-cutting phenomenon in the June/July 2020 Southern African Polymer Technology magazine saying that "past experience has shown that manufacturers quickly look for ways to save money or take shortcuts when the economy takes a downward turn". (2020, p.42)

Thus, the downside of a competitive market is that the quality of pipe manufacturing is undermined because of pervasive cost-cutting practices which amounts to cheating and, as consequence, 'cheap' sub-standard products are entering the market because of unequal competition. Profound failure-related social and economic consequences all round are the result... 'just look at the stats for water lost through leaks, it is astronomical' (Founder, Company I); which, ultimately affects the credibility of the entire sector.

This a reality widely bemoaned by respondents-as-established manufacturers/ suppliers, as the following statements attest.

In the end it's all down to price – how much you can sell you pipe for at the end of the day... (Founder/Owner, Company C)

The plastic pipe industry is in a terrible state... It is the experience of a lot of people that it is very difficult to be a serious player and to sell quality because the competitors are not producing to standard and they're doing it cheaply and therefore you can't get the business. (Founder, Company I)

It's a price war out there... we are all forced to cut our margins just in order to get the work. BUT, you can only cut your margins up to a point... after that you have to start doing 'funny things', like buying in re-grind from guys like Potch Plastics, the 'leaders in regrind', which goes against all the rules and regulations. (Sales Manager, Company F)

The PVC manufacturers run on the absolute lean side because they're trying so save material. But when they go over the edge, that's when you start having failures. Why does it happen? It's all about being competitive...which, unfortunately, in many instances translates into abusing the material content to save costs. So, by extension, the downside of a competitive market is that the quality of pipe manufacturing is undermined because of pervasive cost-cutting practices. (CEO, Company K).

There are people who run a pipe or a fitting very thin or they use sub-standard materials to try and cut the price, they'll put a stamp on – either legally or illegally – and sell them into the market cheaply. (Technical Manager, Company L)

The scale of this 'cost-saving through corner-cutting' phenomenon was highlighted in reference to a 2014 survey which found the number of non-SAN pipes on the market to be nearly as big as that for the SANS mark-bearing pipes. That is, despite, for example, the National Building Regulations stipulating that only SANS-marked pipe may be installed.

SPECIFIC FINDING 40

Additional factors contributing to sub-standard products being produced, sold and installed

- *New small enterprises that enter industry 'on-the-cheap' due to low entry level requirements can only compete price-wise, not at a technical level*
- *Inadequate policing of standards/specifications compliance in regard to manufacturing*
- *'Value chain pressure' on manufacturers, e.g. price pressure or processing time pressure*
- *Ineffectual quality management/ control in regard to installation – invariably amounts to no more than superficial compliance or a rubber-stamping exercise*
- *Distributors/retailers and end-users who are not too discerning about the quality of the products they sell or buy – they only care about price and feel covered if the product carries a SANS mark*

The low entry level to the plastic pipe industry allows small new companies enter the industry 'on-the-cheap'. It was reported that such players are especially prone to price-(under-) cutting by way of materials manipulation as they are only in a position to compete at price level, not at a technical level.

There are industry players, especially some of the new manufacturers, who use shortcuts by blending master batch with natural material and sell the pipe as a P100. These are ex-SAPPMA members ... A while back we heard of a company doing this and we alerted SAPPMA, who did an unannounced audit on them and caught them out red-handed. They subsequently resigned from SAPPMA but still have their SABS mark but what is almost more disturbing is that when you inform SABS about these cases they don't seem to care less. (Sales Manager, Company F)

It was suggested that the only way to address this situation is through orientating and educating new entrants to gain an understanding of the benefits of the latest technology and,

accordingly, appreciate that making an investment in this regard will serve their best interests in the long run.

Inadequate policing results in devious ways go undetected, even outsmarting SAPPMA

The key issue is that it is too easy for these pipes to get sold and installed at construction sites because of the situation not being policed properly. (Technical Manager, Company L)

As a producer I know of companies – suppliers of material – how much tonnage of recycled material is going into their plant... But SAPPMA won't catch them because these guys are very shrewd – they've found perfectly legit ways of hiding it. (Founder/Owner, Company C)

'Value chain' pressure on manufacturers to reduce price and/ or processing time

By virtue of the fact that manufacturers 'control only a small portion of the overall thermoplastic pipe system value chain', they often feel 'abused' by designers, contractors and end-users to the point of 'low productivity and potentially producing products of sub-standard quality'. For example, some customers demand unrealistic prices and therefore expect manufacturers to do 'something for nothing'; or, alternatively exert 'processing time pressure', with product quality as the first casualty; as exemplified by the following respondent statement:

There's always pressure from the client to speed things up because they want it 'now'. If they keep on revving you then quality is the first thing that's compromised... you start cutting down on the cooling time of the weld. When you make a bend, the heating and cooling times should be equal – what those guys in the market don't realise is that if the bend isn't allowed to cool down properly, it will straighten out. (Founder/Owner, Company C)

Non-discerning distributors / retailers and end-users

Distributors/retailers and end-users are fingered for contributing to sub-standard products entering the market by virtue of being either ill-informed or not very discriminating when it comes to quality aspects – if the product carries a SABS or SANS mark they feel they are covered.

Ineffectual quality management/ control in regard to installation

On-site quality controllers are fingered for lacking in basic plastic pipe-related knowledge and awareness, which results in, among other things, signing off on pipe deliveries and then it is only later discovered that, for example, pipes are undersized, out of shape (have become oval due to improper stacking practices) or 'flats spots' developing on the length of the pipe as opposed to only the ends that compromise the pressure capacity of the pipes.

However, ultimate responsibility for a project's implementation and associated quality control protocols is apportioned to the resident or on-site engineer. A respondent with a wealth of experience in piping systems design for various sectors reflects as follows:

From a design point of view I assume the contractor is going to put an appropriately certified product in the ground. Whether this is the case ultimately depends on the Resident Engineer whose responsibility it is to conduct a detailed on-site inspection of the products

and sign off if satisfied. To what extent such quality control measures happen in cases of smaller companies, I won't know... though I have some misgivings. (Technical Director, Company O)

In these regards, respondents reported that in many instances, clients, engineers and contractors 'will ask for generic ISO 9000 paperwork', but very rarely would they ask for things like detailed Certificates of Authenticity (CoA) – thereby driving the point home that, even though a quality management system or controls may be in place, it does not guarantee that 'what goes into the ground is what was specified as per design with regard to quality of product'.

Because a lot of times, as a rubber stamping exercise, the engineer, or contractor, or client will just require you to complete the paper work. They would say: I'm buying these pipes from you for this project, I need a copy of your ISO 9000 or 4500 certificates. But on very few occasions will they actually ask for things like a detailed Certificate of Authenticity. (Technical Manager, Company L)

Additionally, it is felt that it is not so much about the quality management systems but rather about the policing of quality by way of inspections, provided inspectors receive the appropriate training.

SPECIFIC FINDING 41

Unequal competition from traders (buyers and sellers)

- *'Unscrupulous and opportunistic' due to not carrying any production and overhead costs nor do they employ any people*

Manufacturers widely lamented the unequal competitive challenge posed by reported 'unscrupulous and opportunistic' traders who do not employ any people, have no production and overhead costs nor do they have to pay rates and taxes – and reportedly invariably also not VAT. In all, these functionaries are admonished for 'not adding value to anything'.

You've got these other guys, the traders, that's all they do – they don't add value to anything, they don't employ any people – all they do is to sit on the phone and mark it up two and a half percent and make a settlement discount on it. They're making huge money at our costs – but you still have to pay your rates and taxes, all your production costs are increasing all the time. (Founder/Owner, Company C)

For the guys who are buyers and sellers (traders), anything between five or seven and fifteen percent GP is a bargain to them. I can't run a manufacturing set-up at fifteen percent GP; it's impossible... there's wages, UIF, production costs, infrastructure. But those guys only have to worry about having a vehicle and makes a good life for himself at five to seven-and-a-half percent GP. (Factory Manager, Company M)

2.2.9 Diversification – products, services and market (sub) sectors

SPECIFIC FINDING 42

Products

- *Focus on the challenges or impediments to diversification in relation to capital expenditure, human resource capacity and 'imaginative thinking' capability constraints*

Industry views on product diversification largely focus on the challenges or impediments to diversification. Firstly, major capital expenditure is perceived as an essential requirement and in itself an important limiting factor. Secondly, the issue of human resource capacity makes it difficult for small manufacturers to diversify and set up additional dedicated plants as they can't be hands-on with management at two different sites simultaneously.

With respect to HDPE, it was felt that product applications or re-use is only limited by the imagination of the manufacturer and the design capacity. This fresh thinking around the endless possibilities of HDPE will get people out of traditional ways of thinking and is something to be nurtured at university level with product design and testing.

To me, one of the biggest issues that sets our industry back is that people lack imagination [ingenuity] when it comes to all the endless possibilities available to them... and I'm talking about HDPE specifically, also bearing in mind that it's a hundred percent recyclable. There are the most wonderful things waiting to be thought about and made! But no, they rather just stick to the same tried and tested things because they are afraid of taking that next step. (Founder / Owner, Company N)

SPECIFIC FINDING 43

Services

- *Competitive advantage through turnkey business approach / model*

In terms of service diversification, respondents felt that industry can develop a competitive edge through offering clients a complete solution from beginning to end, rather than just supplying pipe.

What makes us a little different is that we do the whole project (i.e. turnkey) – the complete design from the pumps, the valves, etcetera; and then also installation. (Founder Owner, Company N)

SPECIFIC FINDING 44

Market sectors

- *Volume-driven manufacturing self-limiting*
- *Non-traditional sectors were highlighted as possible opportunities for pipe manufacturers are automotive, packaging and gas*
- *Growing market expansion into Africa but demand for South African products not a given*

With pipe manufacturing being a volume driven market sector there is consistent production pressure which precludes a company being able to expand into other market sectors. There was also a view that smaller markets should be left for smaller companies so there was room for everyone.

Three other non-traditional sectors were highlighted as possible opportunities for pipe manufacturers, namely: automotive, packaging and gas.

There was consensus that a huge export market into Africa has opened up and that South African companies are well placed to compete for business as it is much cheaper for African countries to import products and services from South Africa rather than from overseas suppliers.

However, the African market is cited as being ‘complicated and unpredictable’ due to fluctuation in mineral prices and government taxes and restrictions that impact the mining sector, as a consumer of plastic pipe material. For example, exports to Zambia and the DRC in the last year reportedly dropped to almost zero when the price of copper fell and, though it has since recovered, the Zambian government has introduced an extra seven percent tax on the mines, resulting in their moth-balling on a large scale.

Furthermore, a note of warning is sounded that African market demand for South African products is not a given due to product specifications invariably being written in favour of products from ‘donor’ countries, most notably the USA and European countries. A respondent explains:

There’s a big market that’s been opening up in Africa. However, in many instances, the studies of industry people (qualified) in the different countries were funded by way of scholarships or bursary schemes and the like from foreign countries, Europe and the USA. As consequence, these beneficiaries now write specifications in favour of products from these countries, to return the favour, as it were. Alternatively, those donor institutions appoint their own consultants, to the same effect, with the result that entry into the African market would require South African suppliers or installers doing so on a collaborative basis with foreign partners. (Technical Director, Company 0)

2.2.10 Collaborative partnerships and initiatives

SPECIFIC FINDING 45

Critical role played by SAPPMA and Plastics SA

- *SAPPMA and Plastics SA are seen as critical vehicles for bringing industry together and facilitating engagements to solve industry problems in aid of its strengthening*
- *These two industry bodies are also credited for consistently collaborating with industry on issues involving industry inputs for developing training programmes or modules as well as participating in innovation forums*

SAPPMA and Plastics SA are seen as critical vehicles for bringing industry together and facilitating engagements to solve industry problems in aid of its strengthening – for the reason that, collectively, the industry associations have a stronger voice to engage government entities, such as SABS and SANAS, than a single manufacturer would have.

Industry bodies like SAPPMA and the Plastics Federation have become very important and instrumental in speaking for the industry. For example, it is difficult for me as a single manufacturer, maybe even a small one at that, to approach the likes of SANAS or the SABS because they don't really jump around to assist you. But if an industry body representing eighty percent of an entire industry speaks to the SABS or to SANAS, then they tend to listen a little bit. This is where the value of the industry bodies lie. (Technical Manager, Company L)

These two industry bodies are also credited for consistently collaborating with industry on issues involving industry inputs for developing training programmes or modules as well as participating in innovation forums.

SPECIFIC FINDING 46

Collaborative initiatives

- *Community empowerment through re-cycling (Plastics SA) and up-cycling (SASOL) projects lauded*
- *Government support lacking*

SAPPMA's client information and awareness initiatives that highlight the importance of scrutinising Certificates of Conformance where test results are collated is commended and valuable. 'Historical' large companies have also contributed to these effort to inform clients what to look out for and what to ask about.

Plastics SA is commended for its surveys and regular reports – broken down to sub-sector level – on how the industry is doing in regard to recycling, as well as for its plastic waste collection initiative with its strong emphasis on engaging and empowering local communities.

Similarly praised is Sasol's 'up-cycling' project which involves discarded advertisement banners and the like being cut up and sewn into handbags and other items by unemployed women.

However, in regard to all these collaborative initiatives, it is felt that government could do more on a larger scale to support the industry bodies who largely have to rely on private sector backing to initiate, roll out and sustain these type of interventions.

2.2.11 Knowledge and skills shortfalls and development

SPECIFIC FINDING 47

Technical skills

- *Artisans: knowledge and skills shortfalls in regard to modern computerised pipe manufacturing machinery (maintenance), reading and understanding technical drawings, and fault-finding whilst the pool of suitably qualified and skilled artisans shrinking and ageing*
- *Technicians – reading and understanding technical drawings*
- *Specifiers⁸*

⁸ A **specifier** advises the entire project team, not just the design team. Specifiers coach teams about materials and product selections, applications, and integration required to make the project work. A

With a new product being introduced into the market there is a concomitant need for skills associated with new machinery or materials highlighting a need for supplier training and installation skills development.

Specifiers⁹

Artisans

The industry traditionally employs fitters, electricians and toolmakers. Whilst they have qualifications they lack the specialisation of machine knowledge, which means there is a significant amount of on-the-job training required to get the artisans to full productivity on the production line. It is felt that the pool of suitably qualified artisans are small and ageing but unfortunately the younger entrants into the industry have generic skills sets. A challenge with a high volume and production pressurised environment, is that there is often no time to provide the specialist training.

You expect them to know the job when they come here. You want to immediately put them on shift so they can start working but that's not the case – you have to keep them on day work and train them for a month or so... but that's an expense to the company. So that is a big issue – it has been for years but it has become worse now. (Technical Manager, Company L)

With the range of machines used in the plastic pipe manufacturing industry there are some common instruments such as PID temperature controls, AC/DC drives and motors and their control systems which it is easier to get artisans familiar with. The challenge comes in with brand new computerised systems and getting artisans to operate and maintain the systems. Fault finding in particular was highlighted as a skills challenge.

Technicians

Reading and understanding technical drawings was highlighted as a skills deficit amongst artisans with specific reference to mould, dyes and product tooling.

SPECIFIC FINDING 48

Extrusion-related

- *Pipe-makers*
- *Management*
- *Laboratory technicians*
- *Operators – no problem*
- *Welders – no problem.*

specifier is a trusted technical adviser and part of the project team, from start to finish.

<https://www.google.com/search?client=firefox-b-d&q=specifiers+definition>

⁹ A **specifier** advises the entire project team, not just the design team. Specifiers coach teams about materials and product selections, applications, and integration required to make the project work. A specifier is a trusted technical adviser and part of the project team, from start to finish.

<https://www.google.com/search?client=firefox-b-d&q=specifiers+definition>

'Pipe makers'

There is a serious shortage of experienced people, like shift leaders, with sufficient understanding and oversight of the whole process of pipe making and all its nuances. From a supervisory perspective there is a real need for skilled shift leaders in extrusion.

There's a serious shortage of experienced 'pipe makers' to run the plant. When we put up this factory we went looking for someone who understand the whole process. We eventually found someone who had no formal training or qualification – he learned about the machines, the product and raw materials on the job – if this finish contains a little bubble it means there was too much moisture in the material; if there's this kind of line or scratch on the pipe, it means there's raw material got stuck in the calibrator; and so on. (Sales Manager, Company F)

Management

Like shift leaders and oversight, there is also a shortfall of (newly qualified black) managers who 'understand the process and the economics of the businesses.

Laboratory technicians

It is also felt that there is a shortage of skilled laboratory technicians.

Operators

With in-house training and training from Plastics SA and SATAS there is no reported shortage of operators. There is a need to upskill operators when there is a new machine but this is not considered problematic.

Maintenance artisans

With respect to PLC-driven machines, it is felt that there are too few electricians in the market who know how to maintain and fix PLCs. However, this problem could be solved by sourcing young technical graduates from the Universities of Technology and giving them the appropriate training.

Welders

Industry feel that training in welding processes and techniques are widely available and the rest is 'merely following a recipe'.

SPECIFIC FINDING 49

General aspects

- *skilled prospective employees shunned*
- *broad sectoral knowledge and experience lacking*
- *insufficient trans-generational knowledge and skill transfer*
- *reading and interpreting machine drawings*
- *effective listening skills*
- *grabbing (or not) opportunities*

Skilled prospective employees shunned

It was reported that companies employ non-skilled staff as a cost saving measure, as well as a result of being unaware of the benefits of employing skilled staff.

Employers are not aware of benefits that may be derived and for that reason focusses on duplicating opposition organizations but on a lower cost platform. Training of staff in existing positions are of importance and need to be aligned with world class practices. (Respondent 14, Technical Manager, Organisation B)

Broad sectoral knowledge and experience lacking

An overall general knowledge of pipe manufacturing and experience in the field is lacking. It is felt that without this broad sectoral knowledge and experience it is going to be difficult to compete with imported products and technologies.

Insufficient trans-generational knowledge and skill transfer

Related to the point above, there is insufficient trans-generational knowledge and skills transfer taking place, particularly with reference to experientially-acquired tricks of the trade.

Especially on the PVC side, there are many tricks of the trade come into play when bending and stretching the material, which you pick up over time – you won't find them in any textbook. (Respondent 18, Factory Manager, Company M)

Practical knowledge and experience lacking at professional and management levels

There is a lack of adequate practical training at a number of levels, including that of consulting engineers on installation sites who lack the practical application of their book knowledge.

Reading and interpreting machine drawings

With machinery becoming more complex there is a shortfall in people who can read and interpret complex machine drawings and multi-task. It is felt that in general workers are procedural but lack the knowledge to problem solve when needed.

Effective listening skills

One respondent bemoaned his staff's lack of effective listening skills as a result of which instructions are not carried out as intended.

Grabbing (or not) opportunities

We put a guy who he started here (fitting fabrication) on the extrusion side to run the laboratory but he was useless, he hated the job. Now how about this: I put a lady who was the cleaner there, she speaks fluent English, into the laboratory and she just took to it – she undertook internet research on her own initiative and her work is impeccable. It wasn't long before she was basically running... doing everything. I promoted her to laboratory assistant trebled her salary. (Founder/Owner, Company C)

SPECIFIC FINDING 50

Client training

- *SAPPMA and 'historical' companies – information provision on pipe-making and the importance of scrutinising Certificates of Conformance for pipes is commended by industry as an important initiative*

Client information on pipe making and the importance of scrutinising Certificates of Conformance for pipes is commended by industry as an important initiative.

2.2.12 Research and development

SPECIFIC FINDING 51

Very little, if any, industry-specific research occurs at company level

- *Not a priority – producing-to-specification, getting new business, and remaining profitable come first*
- *Benefits too limited in scope – research activity at company level 'traditionally been confined to products and services'*

There is general consensus among respondents that very little, if any, industry-specific research occurs at company level for the essential reason that production and business interests enjoy exclusive priority status.

I used to do lots of it but I'm not interested anymore... I'm just a manufacturer. A client phones me up and says: I need this or that, I need ten of each. We know what's required specification-wise, so there's no need for research... it's straight-forward. (Founder/Owner, Company C)

We stay in a specification that we have and we run through a set that we know and just focus on keeping going, getting new business and remaining profitable... we want to make pipe, and make money. That's what our jobs are about – there's no one who can be spared to focus on research matters. (Sales Manager, Company F)

According to one respondent (Technical Manager, Organisation B), company-level or 'internal' research and development has 'traditionally been reserved for products and services' and is therefore not considered a need nor feasible due to 'benefits being too limited in scope'.

SPECIFIC FINDING 52

Lack of research uptake in support of 'doing things differently'

- *No engagement with research publications or literature and therefore no uptake of industry-specific (formal) research findings; and, consequently no 'pause for reflection' on how things could be done differently so as to strengthen industry*

There is general agreement that, for reasons earlier noted, there is little pursuance of and uptake of information about the latest technological and other developments in industry to be found in industry-specific research publications or literature and towards this end being completely reliant on ‘spoon-feeding’ by industry bodies.

It is furthermore acknowledged that, as consequence, little pause-for-reflection occurs with regard to how industry could do things differently so as to be more quality-focused, competitive and so forth. This very shortcoming is emphasised as a reason for South Africa falling far behind Europe and others, in regard to fabrication (fittings) in particular.

In these regards, one company representative’s ‘admission of guilt’ reads as follows:

As a manufacturer, we at [Company F] are also guilty because we don’t put in the time and effort to read articles and research publications to keep abreast about the latest technology and developments... if it wasn’t for the spoon-feeding by SAPPMA, Safripol, SATAS and so forth. So yes, we never stand back and think ‘What can we do differently? We [as an industry] should be doing this otherwise we’re going to fall far behind overseas countries I mean, as it is, with fittings we are miles behind Europe with regard quality, regulation and so forth. We really do need a mind-shift. (Sales Manager, Company F)

SPECIFIC FINDING 53

Collaboration on product and material development

- *Only ‘reactive’ engagement by way of validating new products and materials (prototypes) from overseas suppliers/manufactures for adoption by industry*
- *In all, the low levels of (substantive) research and development in the industry is decried, with materials development neglect in particular identified as an industry weakness.*

With the faster pace of materials development internationally, South Africa lags in trialling and adopting new products and materials so that their specifications and properties can be written into the SANS standard by the SABS. A respondent provides the following example:

We’re now working with, for example, HDPE 100 (density) but HDPE 120 is already available overseas. Trials are being conducted on this in South Africa but it will only be available for use once its specifications and properties, like tolerances, are written into the ISO / SANS standard 4427 by the SABS – otherwise everyone will do their own thing with it. (Production Manager, Company G)

In these regards, the same respondent holds the view that pipe manufacturers should indeed feel duty-bound to participate in such validation pursuits, when so requested by SATAS, as this ultimately contributes to strengthening the industry.

SPECIFIC FINDING 54

Testing laboratories

- *Insufficient testing and quality facilities at a sector level*

Respondents paid tribute to Renier Snyman as an ‘industry-resource’ for all things quality-related regarding PVC pipe and fittings, laboratory facilities and competence requirements in

particular. However, they still feel there are insufficient testing and quality facilities at a sector level.

In all, the low levels of (substantive) research and development in the industry is decried, with materials development neglect in particular identified as an industry weakness.

2.3 Novel corona virus pandemic – impact and lessons learned

2.3.1 Micro (company) level

➤ *Impact*

SPECIFIC FINDING 55

Impact on business

- *Mixed reports of the impact of the pandemic on businesses depending on which sub-sector they were supplying pipe to, for example, companies working the mining sector, were granted essential service status and although they experienced a significant drop in demand for installations, this was compensated for by way of an exclusive focus shift to maintenance projects.*
- *Conversely, the majority of companies – unless they have pre-lockdown contracts in the bag – are merely surviving at this time; a situation made even more precarious by an erratic power supply from Eskom.*

There were mixed reports of the impact of the pandemic on businesses depending on which sub-sector they were supplying pipe to.

A number of respondents reported that their companies are at this time merely surviving ('just keeping our heads above water'). The Level 5 and Level 4 factory closures significantly impacted the industry with significant losses cited by respondents. This is strongly exacerbated by power outages through load shedding by Eskom which put additional pressure on businesses.

Covid (lockdown) was a problem, we lost R6m because of the factory shutting down. BUT if we didn't have load-shedding on top of it all we could've come back and broke even at the end of the year... so this year we are going to run at a loss. (CEO, Company K)

For example, companies working the mining sector, were accorded essential service status supplying coal to Eskom. Whilst they experienced reduced installations, they shifted their work focus exclusively to maintenance and consequently experienced no negative impact on business. Alternatively, some pipe manufacturers were able to provide pipes to drain Eskom pits when they flooded.

I have 26 teams doing installations and maintenance at the (coal) mines on a rotating basis all the time... we didn't even feel Covid because we were essential service – if the crushing plants stand still Eskom can't generate power. Of course coal exports were halted due to closure of ports, which resulted in some of my installation projects being put on hold. But that gave us the space to focus on maintenance of the plants. (Respondent 19, Founder/Owner, Company N)

SPECIFIC FINDING 56

Impact on supply chain

- *Significant shortages in raw materials due to disruption of supply, particularly from East to West and delays in imported material orders*
- *Stock management vulnerabilities*

The disruption of raw material supply was reported as a significant disruptor, particularly from East to West globally. Raw material imports experienced significant delays across all types of material and impacted the entire pipe manufacturing sector. It resulted in shortages and had a negative impact on stock management in companies.

SPECIFIC FINDING 57

Impact on staff

- *The psychological and emotional impact of the pandemic on staff was reportedly significant, as triggered by the broader societal impact of family members and friends losing businesses, jobs and income.*
- *Resultantly, some companies reported greater appreciation for the need for greater sensitivity in understanding and managing staff in these times.*

The psychological and emotional impact of the pandemic on staff was significant and some companies reported appreciation for the need for greater sensitivity in understanding and managing staff. The broader societal impact of family members and friends losing businesses, jobs and income during 2020 was a significant trigger on the psychological well-being of staff.

I have come to appreciate that our staff have really suffered psychologically and emotionally during this time – you actually see it in their eyes – and we therefore have to be gentler with them, more understanding... not that we were hard on them previously. (CEO, Company H)

SPECIFIC FINDING 58

Impact on organisation

- *Companies were forced to review and conduct a 're-set' concerning structural organisation of company and how work takes place (performance-related efficiencies).*
- *In respect of the latter, for example, time- and cost-savings brought about by virtual as opposed to physical meetings (staff and clients) were widely endorsed.*

From an organisational perspective, respondents felt the impact of Covid was not all negative. A number reported that they were forced to review company performance, efficiencies and productivity. In this way Covid 19 forced a 're-set' of how work takes place, which in turn brought about cost savings and other company strengthening-related benefits. (The nature or outcome of such organisational review measures are presented below).

➤ **Lessons learned**

SPECIFIC FINDING 59

Lessons learned for the future

- *Financial sustainability – reserves to be maintained at all times, as opposed to relying on credit extension*
- *Organisational adaptation driven by need to devise strategies and practices to enhance organisational agility so as to be able to quickly adapt to market changes and issues*
- *Information and communication technology applications – appreciation of the benefits-to-company of remote communication technology-based practices, in regard to efficiency and cost-saving factors in particular*

Ensuring financial sustainability

The importance of financial sustainability in business was highlighted by Covid. One respondent indicated that his business would have gone under had he not always believed in “putting something away for a rainy day”. Sensible planning and ensuring you can afford new machines, rather than extending credit terms were seen as prudent, with those with extended credit pre-Covid 19 finding themselves in a precarious financial position.

My old man who was also in the piping business always told me: ‘if you can’t afford it (machinery), then you can’t have it... but if you really need it, see if you can build it’. (Founder / Owner, Company C)

It (Covid 19 pandemic-induced economic downturn) sounded a note of warning to companies not to be over-reliant on credit...some of the companies who got into difficulties did not necessarily have bad business models, they were just over-extended credit-wise when Covid happened... victims of circumstance, you can also say. (CEO, Company K)

Organisational review and restructuring

Adaptability and flexibility are considered key attributes underpinning company capability to respond to rapid changes or uncertainty in the market (contracted, fluctuation between supply and demand, etc.) and business environment (e.g. health, environmental, economic). By way of strong respondent views, this ostensibly translates into pressure on companies to re-size... ‘to cut the glove to fit the hand’ or ‘keeping it small and dynamic’ – as opposed to ‘going big and corporate’ and associated attributes like cumbersome decision-making processes that give rise to responsiveness lags. One respondent reflected as follows:

If you or your organisation cannot adapt in innovative ways to your changing business environment – although it may be a huge struggle, then you will not survive... that’s generally speaking, but very much highlighted in many cases by the corona virus pandemic. This is specifically true for you big companies because the bigger you get, the slower you become [responsiveness-wise]. (Technical Director, Company O)

It is very difficult to know what the future holds with regard to crises of scale or any other external force which at any time may force you to having to quickly adapt market changes and issues. This is much more of a challenge for the bigger companies – the image comes to mind of having to turn the Titanic around when time of the essence... (CEO, Company H)

More specifically, when considering organisational adaptation, respondents highlighted the importance of effective scanning of company internal and external environments. Keeping an eye on shortfalls and making immediate changes in response to supply and demand is key. Respondents furthermore emphasised that these strategic adjustments must be made on the basis of key indicators.

Closely related, the need for putting in place strategies and plans was highlighted, particularly with respect to alternative resources and demand. One respondent referred to this as designing a disaster recovery master plan for future eventualities and building in short term and medium-term responses based on experience.

In these regards, the needs for multi-skilling or cross-skilling workers as well as teamwork were touted in support of improving efficiencies and cost-effectiveness.

Information and communication technology (ICT) applications

Virtual meetings and tendering are experienced as 'real time-savers as well as a cost-savers'. Work from home options remain in place and may in future continue for administrative staff with young children (corroborating the finding above of a greater sensitivity to the psycho-social well-being of staff).

But the Covid experience hasn't been all bad – it keeps us on our toes and we have had to look at... review our efficiencies and productivity to ensure we make a profit and don't just move plastic around. Also, we are wasting far less time, if I can put it like that, on meeting preliminaries... talking shop over endless cups of coffee and sandwiches – you get down to business far quicker. (CEO, Company H)

The remote communication technology-based practices brought on by the pandemic largely look like they will continue. Respondents see this continuing with remote work, virtual meetings, online conferencing and remote client engagement. The latter aspect holds particular significance considering that local, SADC and international travel will be significantly diminished for some time to come.

Dealing with clients online works quite well and will continue in many cases in the future – I have been doing quite a bit of that during this time with clients in Botswana, Zimbabwe and so forth. (Technical Manager, Company L)

What has become clear to me all over again is how adaptable people are – how they found new ways of doing business. (Technical Manager, Company L)

However, it was noted that while online training has a place in the future 'new normal', it cannot fully replace the value of face-to-face training engagements. Similarly, some respondents bemoaned the lack of networking opportunities presented by physical conferencing.

2.3.2 Macro (sector) level

SPECIFIC FINDING 60

Impacts

- *Mining sector downturn*
- *Market 'down and up'... but uncertainty about longer-term*

- *Disruption of or delays in raw material supply, particularly from East to West, impacted the entire pipe manufacturing sector by way of shortages and negatively impacting on stock management*

The plastic pipe manufacturers have been indirectly affected by the overall downturn in the economy with Covid and the mining orders and tenders that have shrunk have impacted the pipe supply tenders who in turn will need to look at staff retrenchments.

For example, the local coal mines experienced a drop-off in export orders and therefore held back on planned new pipe installations at their coal-washing plant. So all of a sudden our installation teams sit without contracts, the consequence being that we'll have to lay off people in the near future. So the Covid snow ball effect is now beginning to hit us. (Sales Manager, Company F)

At the time of the research interviews (September/October 2020), companies reported business picking up and they attribute it to the construction industry picking up and the positive knock-on effect on the supply chain. Despite this positive uptick there is still concern about the longer term stability of the market.

I am not sure exactly what stimulated this and not knowing this makes me worry about how long it's going to last before everything quietens down again. (Technical Manager, Company L)

With the positive market activity, industry cautioned about pressure on surviving companies who need to increase production or expand to meet the increased demand.

For some, Covid did not pose a threat to their businesses as they could claim to be essential services. They also felt that with pipe extrusion there are few people in a confined space at any time, minimising the threat of transmission amongst staff.

The unavailability of raw material has been the main challenge posed by Covid.

Apart from disruptions in the beginning during level five lockdown, the industry has been treated very well by government as it was allowed to continue. Some companies are running at record levels. The main challenge is about raw materials – to find enough raw materials for what they want to do. (CEO, Company I)

➤ **Silver linings**

SPECIFIC FINDING 61

Realignment towards quality production

- *Knock-on effect of company closures – the release for absorption into the sector of a pool of individuals with very good skill sets, like experienced operators*
- *Industry shake-up as many 'bad apple' companies will not have survived, in regard to which a realignment towards quality production is hoped for*

It was surmised by respondents that Covid may have given the industry a shake-up as 'bad apple' companies will not have survived. It was hoped that this might lead to a realignment towards quality production, and that in this way Covid may be a good outcome for industry.

Knock-on effect of company closures

With company closures forced by Covid, there is a pool of expertise that has been released for absorption into the sector.

There are a few companies that really took bad knocks or had to close down because of Covid... which, ironically, is good for the industry because there are now individuals with very good skill sets, like experienced operators, who are now available to be absorbed into existing or surviving companies... at a price, of course. (Production Manager, Company G)

➤ ***New normal***

SPECIFIC FINDING 62

New normal

- *Value chains – two points of view emerged: (i) no significant changes and (ii) value chain becoming shorter and more focused.*
- *Market dynamics – reduction in the commodity environment and an increase in specialised products and service; and it is also hoped that with better awareness of health protocols there may be a concomitant commitment to clean water infrastructure and waste water management*

Two points of view emerged with respect to value chains in a ‘new normal’ environment. The one foresees no significant change the value chain, whilst the other anticipates the value chain becoming shorter and more focused. This could be a potential positive outcome in regard to the material supply disruptions experienced globally during lockdown.

➤ ***Market dynamics***

SPECIFIC FINDING 63

New normal

- *Value chains – two points of view emerged: (i) no significant changes and (ii) value chain becoming shorter and more focused.*
- *Market dynamics – reduction in the commodity environment and an increase in specialised products and service; and it is also hoped that with better awareness of health protocols there may be a concomitant commitment to clean water infrastructure and waste water management*

Industry respondents surmise there may be a reduction in the commodity environment and an increase in specialised products and services. It is also hoped that with better awareness of health protocols there may be a concomitant commitment to clean water infrastructure and waste water management.

3. Respondent recommendations for strengthening industry

3.1 Micro (company) level

3.1.1 Attributes & practices making for a healthy and competitive company

SPECIFIC RECOMMENDATION 1

Lead by example – driven and committed

- Successful companies need the drive or will to make the business work and to be prepared to struggle until you get it right and get to the top
- Similar commitment expected from staff in terms of self-motivation and commitment

SPECIFIC RECOMMENDATION 2

Commitment to core company values and business principles

- For example, non-negotiable upholding of quality of products and service delivery and 'ethical' pricing.

SPECIFIC RECOMMENDATION 3

Synchronisation

- Regular checking-in to ensure coordination of all the divisions and product lines in the company's value chain so as to address blockages more swiftly / proactively – keeping divisions synchronised means better alignment

SPECIFIC RECOMMENDATION 4

Optimal production principles in regard to 'competitive pipe-making'

- Production efficiency and cost-effectiveness and produce sufficient quantity/volume so as to meet demand at any time
- Produce to spec using as little material as possible

SPECIFIC RECOMMENDATION 5

Reputation development

- Build and nurture company reputation as quality, reliable, and ethical manufacturer or supplier ... whereby you are prepared to stand or fall

SPECIFIC RECOMMENDATION 6

Professionalism

- A professional approach to tendering (documentation presentation) – underpinned by sound project management expertise – increases chances of successful project bidding outcomes.

SPECIFIC RECOMMENDATION 7

Building a strong and happy team

- *Employ 'good' people – i.e. who, over and above possessing required expertise levels, care about positive humanity and fully commit to company values and, as consequence, contribute to good teamwork and productivity*
- *'Look after your people and they will look after you' (monetary rewards)*
- *Trained staff retention and loyalty systems need to be developed*

SPECIFIC RECOMMENDATION 8

Business insurance

- *Ensure the business is properly insured – case in point: companies that did not register their employees on UIF denied their employees associated benefit when the country went into hard lockdown*

SPECIFIC RECOMMENDATION 9

Organisational review and adaptation

- *Fostering agility (adaptability and flexibility) in response to rapid changes in the market and business environment – keeping it 'small and dynamic' as opposed to 'going big and corporate'*
- *In this regard, multi-skilling or cross-skilling workers was noted as a critical company attribute*

SPECIFIC RECOMMENDATION 10

Improving evaluative and planning mechanisms and efficiencies

- *measuring of key performance indicators*
- *company-side benchmarking*
- *improved planning for and implementation of change*
- *establishing the cost of non-conformance and inefficiencies in all departments*
- *internal audits to improve inter-divisional synchronisation*

SPECIFIC RECOMMENDATION 11

Reviewing business offerings

- *Move away from the traditional focus on product and service benefits and features (only) to a whole-system approach with its 'unique whole life benefits and features'*

SPECIFIC RECOMMENDATION 12

Promoting plastic pipe as material of choice

- *Plastic viewed as offering better options or solutions than steel, with particular reference to municipal water reticulation systems, the scope of such potentially offering the single-most significant stimulus to the plastic pipe value chain*
- *Expanding plastic pipe applications into construction, with particular reference to applications in regard to window frames and wall panels, the latter which reportedly would greatly enhance thermal efficiency of houses*
- *'Untapped' applications waiting to be developed in the future*

SPECIFIC RECOMMENDATION 13

Product and quality training

- *Product training (fittings) for staff and clients*
- *Contractor / end-user awareness-raising about quality standards adherence*

SPECIFIC RECOMMENDATION 14

Investing in specialised technologies

- *boosting company efficiency through investing in ERP*
- *modern extrusion equipment to increase speed and tolerance accuracy*
- *non-destructive testing technologies in regard to fusion welds*
- *digital transformation, for example, the use of digital applications to trace batch quality and compliance to Certificates of Authenticity*

3.2 Macro level (sector and beyond)

3.2.1 Countering corner-cutting / sub-standard manufacturing and installation

SPECIFIC RECOMMENDATION 15

Regulate price

- *SAPPMA could set a minimum price for a month – a benchmark*
- *Revert back to ECSA fee scales*

3.2.2 Growing the market

SPECIFIC RECOMMENDATION 16

Promoting plastic as material of choice for piping systems

- Awareness raising about plastic pipe performance and benefits, which are generally not sufficiently understood and in particular targeting installers and contractors who remain focused on the more traditional materials to the detriment of plastic pipe options
- Creating an overall awareness of the thermoplastic pipe system would be beneficial, so too the long-term quality of the products

SPECIFIC RECOMMENDATION 17

Optimising plastic pipe value chain:

- revise tariffs on imports
- keep the cheaper fittings out of the market – it's not always about price
- mandating local procurement rather than cheap and inferior quality imports
- managing the use of plastic pipe in certain projects based on its application benefits
- ongoing technical support for designers and user
- education of specifiers¹⁰
- improve the visibility of lead times
- more pressure on cost reductions across the value chain
- uniform selection and evaluation criteria to eliminate contractor manipulation and abuse
- competent suppliers who understand the latest technologies
- adherence to high quality-driven pipe manufacturing according to specification will improve the value chain offerings

SPECIFIC RECOMMENDATION 18(a)

Improving quality management and control – MANUFACTURING

- Properly funded and managed external quality control
- Quality control of imported products
- Inculcation of a culture of appreciation of quality manufacturing
- More frequent audits need to be conducted – increased 'policing' – to improve compliance to existing specifications
- Promote appreciation of the value of quality materials and workmanship

SPECIFIC RECOMMENDATION 18(b)

Improving quality management and control – ON-SITE (installation)

- There is significant opportunity for good practice with respect to standards and quality control. It is something new and needs to be further developed.

¹⁰ A **specifier** advises the entire project team, not just the design team. Specifiers coach teams about materials and product selections, applications, and integration required to make the project work. A specifier is a trusted technical adviser and part of the project team, from start to finish. <https://www.google.com/search?client=firefox-b-d&q=specifiers+definition>

- *Every batch of pipes must come with a Certificate of Authentication which contains the batch numbers, the dates and times of the batch run, the test results and the dates and times scrap was produced and the reason. (The contractor could even supply a sample of the batch product for testing and a replacement as the sample is destroyed in the process of testing.)*
- *Similarly with on-site welding of polyethylene, the welder must be qualified and have a welding stamp which is traceable back to his qualification. The welder must do test welds before starting work on a batch.*
- *Though this type of detailed quality control is time-consuming and resource-consumptive, but is recommended in light of potential failures and litigation*

3.2.3 Testing facilities

SPECIFIC RECOMMENDATION 19

Benchmarking

- *The former DPI laboratory set-up and competence (though PVC-focused) viewed as an ideal or benchmark for industry*

SPECIFIC RECOMMENDATION 20

Enhancing availability and access

- *It is suggested that such high-quality facilities could be hosted by universities for free so that companies can verify they are producing to spec and that the SABS stamp they obtain is an accurate reflection of the quality of their products (currently not necessarily the case)*

3.2.4 Research and Development

SPECIFIC RECOMMENDATION 21

Materials development focus

- *Materials development should be included in R&D initiatives so as to make possible local production of high quality polymer formulations at a competitive price*
- *In this regard, an industry-directed R&D facility should be established that focuses on materials development for pipes*
- *Funding for R&D should come from both government and industry*

3.2.5 Approach to projects

SPECIFIC RECOMMENDATION 22

'Progressive' methodology

- *Adopt a systems approach to project design and implementation*
- *Build in efficiencies at planning and specification phases of projects*

3.2.6 Government sector

➤ General

SPECIFIC RECOMMENDATION 23

Improve the environment for doing business, with particular reference to:

- opening up markets
- improving the electricity supply,
- making it more conducive to invest in the agriculture sector, in regard to irrigation systems in particular (investment is eroded by the threat of land claims)
- reducing energy/electricity tariffs for targeted sectors
- adhere to payment terms for municipal/government projects to prevent excessive financial burdens on pipe producers – institutions such as the DTIC and play a role and act as a catalyst in this regard

SPECIFIC RECOMMENDATION 24

Infrastructure development plans and imperatives

- Deliver on annual promises regarding larger infrastructure development projects need to happen to boost the economy.
- Government spend – budgets for water infrastructure are vastly inadequate
- Reticulated water infrastructure maintenance and development needs to be prioritised and should involve a coordinated effort by government and all industry role players (against backdrop of 'astronomical' scale of water leaks)

➤ Local Government

SPECIFIC RECOMMENDATION 25

Strengthening municipal water and sanitation systems

- Income from rates and taxes on water and sanitation should be put directly back into water and sanitation infrastructure maintenance and repair budget and not into the general municipal budget. This measure would stimulate ten to twenty percent growth in the plastic pipe manufacturing and installation sector – a much-needed boost
- By using 'one-pressure class-higher' pipe size for reticulation purposes, a 50-year life-span or regression could reasonably be envisaged for PVC pipes as this measure would offset pipe degradation factors like poor handling, ground conditions, and the like.
- Using permanent water pressure management as preventative maintenance measure

SPECIFIC RECOMMENDATION 26

Strengthening quality management and control

- For industry regulatory bodies to devise a 'standardised quality control methodology' to counter exploitation by unscrupulous contractors

3.2.7 Modernising of industry machinery

SPECIFIC RECOMMENDATION 27

Investment in modern machinery so as to promote innovation, efficiencies and pricing

- Funds need to be made available for the modernising machinery will be applied and the question remains as to where the funding will come from and what corresponding criteria and framework will apply
- Visibility and stability of volume forecasts need to be improved as this will lead to a greater likelihood of technology investments, with their own value benefits

3.2.8 SOEs

SPECIFIC RECOMMENDATION 28

Privatisation of key utilities

- It was felt that privatisation of SOE's like Eskom and Water Boards would lead to better expenditure and efficiencies

3.2.9 COVID-related support by government

SPECIFIC RECOMMENDATION 29

Working capital relief

- Many companies are not turning over, which puts them under working capital strain

SPECIFIC RECOMMENDATION 30

Debtors' book insurance gap

- Opportunity for government to render support to close the debtors' book insurance gap so as to help companies to increase turnover; or, at least keep it at the same level (Credit Guarantee Insurance Corporation guarantees collapsed during Covid)

3.2.10 Collaboration

SPECIFIC RECOMMENDATION 31

Form and focus

- *SAPPMA is considered to be best placed to provide a forum for engaging and networking role-players to solve industry problems and strengthen it*
- *Finding common ground with respect to regulation and implementation to improve oversight and quality control represents a pressing need*
- *The possibilities for collaboration go beyond competitiveness to such things as sharing of laboratories*

3.2.11 Training imperatives

SPECIFIC RECOMMENDATION 32

Education of end-user

- *There is a need for contractor and end-user education as a means of promoting quality product and specification*

SPECIFIC RECOMMENDATION 33

Extrusion-related

- *Focus on management/senior level training to promote overall understanding of the extrusion process will have knock-on benefits further down the line*
- *Operator training is only required in the instances of new modern equipment acquisition, in order to maintain tolerances*

SPECIFIC RECOMMENDATION 34

Municipalities

- *Training is needed to enhance understanding of all aspects involved in projects to ensure tenders are allocated appropriately*
- *Upskilling is also required of municipal staff responsible for infrastructure maintenance*

4. Overall findings and recommendations

Having in the foregoing sections presented specific findings derived from respondent perspectives on issues and challenges at company and sector level and their contribution to sector under-performance, the focus now shifts to emerging themes and topics at the level of overarching synthesis and interpretation, as they inform overall findings regarding 'industry baseline' and challenges and corresponding recommendations for strengthening the plastics pipe manufacturing sector, with particular reference to the overall value chain optimisation.

4.1 Overall findings

4.1.1 Baseline

OVERALL FINDING 1

Small, medium and large enterprise differentiation

- *New small enterprises that enter industry ‘on-the-cheap’ due to low entry level requirements can only compete price-wise, not at a technical level*
- *A new black entrant to the industry experiences the pipe manufacturing sector as being controlled by ‘the old guard’ who protect their market share jealously, which comprises a significant obstacle for fledgling black owned businesses*
- *Struggle for survival on the part of new small start-up companies is generally attributed to them all tending to do the same thing in regard to market segment focus*
- *‘Too small to be big but too big to be small’ dilemma which arises from a situation when resource capacity, in regard to ‘purpose-built’ machine usage specifically, cannot sufficiently offset increases in overheads that accompany company growth so as to be able to compete with bigger players.*

There are distinct differences between large well-resourced companies and lesser-resourced new entrants. There has been a significant increase in the number of small entrants into the market with low barriers to entry viewed by established players as contributing to poor quality due to lack of quality management, experience and cost cutting measures in production. By the same token, new entrants feel that the industry is racially biased and the ‘old guard’ do not welcome new players in the market.

Small start-up companies struggle for survival is seen as a result of small companies focusing on a specific market segment and not diversifying their pipe specifications. This relates to resource capacity and the “too small to be big” conundrum to allow competition with bigger players.

OVERALL FINDING 2

Leadership in both government and industry

- *Human & physical resources shortfalls*
- *Shortfalls at the level of planning or prioritising and overseeing work due to insufficient levels of knowledge and expertise – specifically engineering skills or expertise required for managing the process of repairing or replacing old infrastructure*
- *Lacking in nuanced, nitty-gritty understanding of market and organisational/ operational dynamics*

Both industry and municipal respondents decry the “interference” of financial and procurement decision makers who do not understand the business. Both ask for the “engineering voice” to be brought back into the Board Room of companies and into the procurement divisions of government. For government respondents the human resource shortfalls are a challenge.

OVERALL FINDING 3

Value chain pressures and quality management issues

- *Value chain pressure on manufacturers*
- *Ultimately there is appreciation that quality control shortcomings is not so much about the quality management systems per se but rather about the policing of quality by way of inspections, provided inspectors receive the appropriate training so as to guarantee that 'what goes into the ground is what was specified as per design'*
- *On-site quality controllers are fingered for lacking in basic plastic pipe-related knowledge and awareness*
- *Clients, engineers and contractors are castigated for 'superficial compliance' to and treating quality control as a 'rubber-stamping exercise', for example, abiding by 'generic ISO 9000 paperwork' as opposed to asking for things like detailed Certificates of Authenticity (CoA)*
- *Production costs and price-cutting through corner-cutting and, ultimately, specification-cutting in relation to materials usage (manipulation of polymer content)*
- *Unscrupulous and opportunistic' traders who do to not carry any production and overhead costs nor do they employ any people*

The value chain pressure on manufacturers often relates to quality control shortcomings and a lack of suitably qualified people in the value chain from specifiers to installers. Manufacturers only control a certain portion of the value chain and also feel abused by designers, contractors, and end-users for the undue pressure they put on them with respect to price and processing time. This potentially results in sub-standard products getting onto the market and perpetuates a negative industry perception that is not necessarily the doing of the manufacturer.

The other value chain pressure on manufacturers relates to price cutting and specification cutting by manipulating polymer content, in order to remain in business and win a tender. Closely related to this is the work of "traders" in the value chain who are seen as opportunistic in that they take a cut but carry none of the responsibility or costs.

Despite the negative supply chain pressures on price and quality, industry recognised that the interventions of SMME mentorship in the mining sector supply chain for pipes has had a positive outcome for both producers and the mines.

OVERALL FINDING 3

Limited engagement from industry on diversification opportunities

- *Focus on the challenges or impediments to diversification in relation to capital expenditure, human resource capacity and 'imaginative thinking' capability constraints*
- *Competitive advantage through turnkey business approach or model rather than just supplying pipe*

Product diversification is not a strength of the pipe manufacturing sector. They attribute this firstly to the capital expenditure and machinery requirements to add another 'line' to their factories. Secondly for the small and medium companies it is often a matter of senior people having sufficient time to set up and monitor a new product line. However, it was also noted

that the industry is limited by its own imagination in terms of what product diversification could potentially take place, illustrating a more conservative aspect to the industry.

In terms of market diversification, the drive for volumes to remain competitive become self-limiting for industry. Opportunities in the auto, construction, packaging and gas industries remain unexplored and market penetration in Africa limited.

OVERALL FINDING 4

Greed and associated sub-standard products and services as consequence undermining the industry

- *Existing (market-dominating) companies* –
In their quest for securing dominance in a particular product market, such companies eventually fail as a consequence of unsustainable business models and income streams
- *New entrants to the market* –
In their quest to ‘get rich quick’, new entrants to the market fall foul of charging too-high prices for products and services at the outset due to not being prepared to first grow their businesses into the kind of prices they’re charging at the outset. Consequently, they fail by way of pricing themselves out of the market.

Price cutting and quality short cuts and regrind material use an unfortunate reality of the industry right now. The relentless push for volume and price drive a hard wedge in the industry where players are vying for market share. Backyard operators are fingered as significant culprits but large companies are also charged with market domination and over pricing for certain products by virtue of their size.

4.1.2 Key challenges facing the plastic pipe sector value chain that inhibit plastic pipe sector growth and competitiveness

OVERALL FINDING 5

Raw material constraints

- *Fluctuation in raw material supply or availability and quality (HDPE) and volatility in the price of raw materials*
- *Lack of substantive research and development and associated innovation concerning the local production of raw materials – as opposed to merely copying developments in the international market*

Fluctuation in raw material supply or availability comprises the single-most critical value-chain element affecting plastic pipe manufacturers – that is, in ‘immediate’ and ‘physical’ ways concerning production. This aspect, unsurprisingly, also represents their greatest vulnerability as they are at the mercy of a host of variables causing supply-chain volatility at any one time – as accentuated by the critical shortages in raw materials experienced in the period of worldwide Covid-19 lockdowns.

Relatedly, volatility in the price of raw materials, whether for reasons of supply chain vagaries or unfavourable exchange rate or Safripol's alleged 'disingenuous' pricing strategy (Specific Finding 19), has a similar direct impact on business viability.

Finally, the quality of raw materials in regard to the manufacturing of HDPE pipe products specifically, represents widely raised 'over-the-limit' usage of regrind.

Against this backdrop, the lack of research and development and associated innovation concerning the local production of raw materials – as opposed to merely copying developments in the international market – is widely bemoaned as constituting a critical factor inhibiting sector strength and competitiveness; ironically so, considering the accolades heaped on SAFRIPOL scientists for their 'world-class' expertise.

OVERALL FINDING 6

Outmoded pipe-making technology and machinery

- *Generally aged or outdated status of pipe-making technology and machinery undermines competitive pipe-making capability,*
- *An impediment unlikely to be turned around without material support from government coffers*

The majority of manufacturers, that is, apart from the established, high-level players, for a range of reasons are unable to invest in current or modern top quality pipe-making equipment and incorporate the latest technologies so as to embrace 'competitive plastic pipe-making principles'; that is, producing at the highest efficiencies and outputs and finest tolerances possible and in compliance with quality standards and product specifications.

Consequently, the generally old or outdated technology and equipment currently populate the majority of production plants is (widely bemoaned for) setting industry back and disadvantaging the local market when compared to global competitors.

OVERALL FINDING 7

Critical human resources and knowledge and skill shortcomings

- *Managerial level knowledge and skill gaps*
- *Technical skills shortfalls*
- *Trans-generational transfer of knowledge and skills*

The most critical human resource function gap identified was 'varieties' of management competence' with capability shortfalls. The most pronounced identified were the following:

- Lack of sufficient knowledge and understanding of the 'economics' of the overall extrusion processes, with particular reference to 'new generation managers'.
- Project management skills with regard to construction/ installation and an understanding of how all the different components fit and work together interdependently is missing; in other words, an understanding of quality management/

control from initial tender specification and evaluation to process management and installation and sign off.

Caution and concern were expressed in strong terms with regard to future problems when *older generation artisans and 'pipe-makers'* exit the system. There is an in-sufficient degree of transfer of trans-generational knowledge and skill. In other words the cumulative, experientially-acquired tricks of the trade (tacit knowledge) and not being transferred.

Four specific skills sets were identified as specific shortages in the industry. These relate to *plumbers, electricians, PLC technicians and installers*. It was felt that improved industry specific skills sets in these areas would enhance the shortfalls in the supply chain optimisation.

OVERALL FINDING 8

Research and development disconnect

- *In all, the low levels of collaboration between industry and research institutions/ agencies around (substantive) industry-specific research and development activity constitutes a critical area of industry weakness*
- *None more so than in regard to materials development, considering the prohibitive raw materials costs companies have to contend with.*

As highlighted by way of specific findings (53–55), industry-specific research at company level hardly occurs at all – that is, apart from selective activities like the characterisation of materials, research on new materials and testing of fabricated products. Furthermore, accessing industry sub-sector specific research outputs and the actual uptake of relevant research findings in support of 'doing things differently' compared to just 'producing to specification' is not happening at all. As such, enterprises are foreclosing on opportunities for information-driven reflection and decision-making in regard to process and product innovation, introducing cost-saving measures in relation to improving production efficiencies and outputs, international 'best practices' in regard to both production and quality management enhancement.

Unsurprisingly, the occurrence of research-driven collaboration between companies or industry 'broadly' and research institutions or agencies is negligible and currently only comprises trialling newly overseas-sourced product and material prototypes at the behest of a relevant industry body like the SAPPMA and SATAS – and by way of spoon-feeding by the latter.

OVERALL FINDING 9

Government failing to deliver on its mandate for demand-led sector growth and strengthening

- *Limited-/ non-delivery by Government, as single most significant 'strategic' partner and end-user, on promises of major investment in infrastructure development and maintenance projects in support of economic recovery and growth*

Government, as the largest and strategically-most-important consumer of plastic pipe sector products and services by way of infrastructure development and maintenance projects in support of economic growth, has for years been falling far short in delivering on this 'mandate',

as evidenced in a reported dramatic decline in tenders, reflecting a corresponding decline in infrastructure spend; huge project backlogs for reasons of overly long and excessively bureaucratised procurement processes and protocols, misappropriation of funds/ corruption, as well as capacity-related aspects. Particularly irksome are instances where capacity has been increased in response to promised major expenditure, which is then under-utilized due to below promised level actual investment.

Of note in these regards and against the backdrop of the much-touted Economic Reconstruction and Recovery Plan (ERRP), President Ramaphosa, in his address to a joint sitting of Parliament on 15 October 2020, announced the implementation of Operation Vulindlela as a joint initiative of The Presidency and National Treasury. It is touted to 'fast-track the implementation of (already-existing) high-impact structural reforms focused on changing the structure of the economy to reduce input costs, lower barriers to entry and increase competition'. Underpinning assumptions are that 'lower costs and greater efficiency increase the competitiveness of the economy and create new opportunities for investment'.

More specifically, Operation Vulindlela is slated to modernise and transform network industries, including electricity, water, transport and digital communications – which are perceived as comprising 'the bedrock of economic growth and are essential to creating a globally competitive economy'.

A total of 19 priority reforms have been identified, five of which are located in the water sector with the overall desired outcome framed in terms of '*sustainable water supply to meet demand*'. Of particular significance in regard to the research study focus is the one aimed at '*addressing institutional inefficiencies in municipal water and sanitation services*', outlined as follows: 'reform actions' related to the implementing of a comprehensive national programme to support municipalities to improve water services performance; 'reform implementers' comprise the departments of Water and Sanitation (DWS) and the Department of Cooperative Governance and Traditional Affairs (COGTA), National Treasury, the South African Local Government Association (SALGA) and the Development Bank of South Africa (DBSA).

Additional dedicated capacity for Operation Vulindlela has been created in the Project Management Office (PMO) in The Presidency as well as in National Treasury. The Vulindlela Unit reports directly to the President as well as to the Ministry of Finance, and provides updates to Cabinet and the National Economic Recovery Council. Finally, the expected timeframe is slated as December 2021.

4.2 Overall recommendations

OVERALL RECOMMENDATION 1

Optimising the value chain

- *Improving quality management and control – MANUFACTURING*
- *Improving quality management and control – ON-SITE (installation)*

In terms of recommendations, there is an opportunity to optimise the value chain and to explore solutions from the beginning to the end of projects as per the specific recommendations 17 and 18. Government in particular would welcome support in terms of standardised quality control methodologies spanning specification to installation.

It is possible that digital transformation both on the shop floor for quality assurance, as well as an industry wide opportunity to trace batches and compliance and Digital Certificates of Authenticity, offers a streamlined solution. With improved evaluative and planning mechanisms there is an opportunity to leverage improved efficiencies in companies. Synchronisation and data management offer an opportunity for industry improvement. A QR code and application based offering, potentially linked in to municipal site engineers would make a big difference in optimising the value chain around pipe manufacture, transport, installation and maintenance.

Other specific value chain optimisation recommendations include revising tariffs on imports, designating for local procurement, providing technical support for designers and users, uniform selection and evaluation criteria and high quality specifications. Keeping cheaper fittings out of the market and potentially mandating for local procurement could be beneficial. Technical supports for designers and user as well as education of specifiers is seen as important from a knowledge value-add perspective. Uniform selection and evaluation criteria to eliminate contractor abuse, as well as competent suppliers who understand the latest technologies would enhance the supply chain.

On site installations and quality control practices would further enhance and improve the value chain, including Certificates of Authentication mentioned above, that contain batch numbers, the dates and time of batch runs and test results for the pipes. Similarly, a process of control and traceability could be implemented for the on-site welding traceable back to the welder and associated qualification.

OVERALL RECOMMENDATION 2

Learning from Covid-19

- *Shorter more focused value chain*
- *Benefits of ICT applications*
- *Organisational adaptability*

Company adaptability and flexibility are strong lessons learned from the ongoing Covid-19 pandemic that can be carried forward by the industry as positive attributes to strengthen business and to remain small and dynamic. Covid-19 has forced companies to view staff more compassionately, to review company performance, efficiencies and productivity. The closure of some companies is not altogether viewed in a negative light, with some respondents seeing the release of a pool of experienced staff into the industry as a positive development. The overwhelming, but not well articulated impact of Covid-19 on industry respondents, has been a cautionary approach to business.

OVERALL RECOMMENDATION 3

Strengthen and empower industry bodies

- *SAPPMA could set a minimum price for a month – a benchmark*
- *Revert back to ECSA fee scales*
- *Benchmarking of testing facilities and promoting availability and access*
- *Investment in modern machinery so as to promote innovation, efficiencies and pricing*

Industry promotion via the various different industry bodies is seen as crucial for the sector. By strengthening and empowering these entities, there is greater potential leverage to, for example, revert to ECSA fee scales to regulate and improve the awarding of government tenders by levelling the playing fields for industry.

Likewise, SAPPMA is potentially better positioned to regulate prices. They can also possibly provide technical training for municipal procurement personnel to improve the perceived huge misalignment between industry suppliers and municipal functionaries. In addition, it is felt that far more could potentially be done to improve handling and installation processes, with education, awareness and improved quality assurance being key to improvement in this part of the supply chain.

Industry bodies are also better placed as a collective entity to approach universities to undertake the materials development and testing needed to strengthen an applied research and development component in industry, which is currently lacking.

Lastly, it is felt that funding for modernising machinery is desperately needed and some type of manufacturing enhancement competitiveness incentive could boost the industry significantly. As bodies representing the industry, organisations such as SAPPMA are well placed to engage the DTIC on the possibility of future funding mechanisms.

5. Conclusion

Having considered the perspectives of informed respondents located in various industry settings, as well as local government, it can be concluded that, yes, the plastic pipe sector is indeed in distress, by-and-large, in regard to both company and overall industry sustainability and performance. Accordingly, a range of contextual factors responsible for specific areas of weakness/ underperformance across the value chain have been comprehensively identified and described which, cumulatively are responsible for compromised quality of products and services that in themselves reflect on industry shortcomings, competitive-wise.

That said, it can also emphatically be concluded that there is no reason why the fortunes of this relatively small and not-exceptionally-complex economic sector cannot be turned around by way of visionary leadership and broad-based commitment and effort so as to assume world class status. There are too many historical and current examples of sustained performance excellence for such an eventuality not to be considered possible.

Annexures

Annexure 1:

Summarised specific findings and recommendations

Summarised Specific Findings¹¹

Perspectives on key industry issues and challenges

Micro (company) level issues

- *Non-industry-savvy leadership a recipe for ruin*
- *'New generation' staff members displaying lack in loyalty and commitment to the company, with attendant impact on company including*
- *Greed as main enemy to enterprise sustainability*
- *Organisational growth dilemma – 'too big to be small but too small to be big...a dangerous place to be'*
- *Established quality management culture and associated quality control measures generally in place and adhered to, regarding SAPPMA members in particular*

General aspects

- *Pipe-making perceived as life-giving/-enhancing endeavour.*

Pipe-making technology & machinery

➤ *Current status*

- *Generally old/ outdated, which is setting industry back/ disadvantages the local market when compared to global competitors*
- *Imported extrusion machinery/ equipment not aligned to the South African manufacturing environment, e.g. not supporting short runs*

➤ *Developments in pipe-making technology and equipment/ machinery*

- *Electrofusion welding*
Mechanical fittings and compression still widely in use, with the result that a skills deficit is being experienced in this area
- *Electronic integrated business management systems*
Whilst enterprise resource planning (ERP) systems are lauded for boosting efficiency, high admin-intensive manual processes are still widely used
- *Nanotechnology and nanostructure additives for improvements in material properties*

¹¹ As informed by industry respondent perspectives, unless otherwise noted.

Potential usefulness of these applications acknowledged but limited current adoption for reasons of their complexity, standards not yet developed, and specialised machinery and associated expertise/ skills requirements

- 3D printing
The process is slow regarding product fabrication but for mould-making 3D printing offers a significant time saving and is becoming a lot more common
- Tablets and iPads
Still not widely used in the industry, but its application is appreciated for quality control and the fact that captured data can automatically be stored in the cloud, from where it can be accessed and analysed
- Android and Apple applications
Potential use appreciated at point of sale to instantly access a certificate of conformance for a pipe or fitting where the relevant information for each pipe is stored in the cloud

Raw material issues and dynamics

➤ **Materials development**

- *Very little materials development happening locally as industry essentially copies new developments as they become available overseas*

➤ **SAFRIPOL**

- *Criticised in some quarters for playing an unfair pricing game, which creates imbalances in the supply chain but at the same time hailed as world-class regarding engineering expertise*

➤ **Covid-19 impact**

- *Disruption of the raw material supply chain has been substantial with shortages and delays now having become a general problem whilst at the same time overseas sourced material is very expensive for several reasons*

Quality management and control

➤ **Manufacturing**

- *'Very active' industry bodies are hailed, SAPPMA in particular, for promoting responsible manufacturing and work closely with SABS and SANAS as well as civil engineers and the construction industry –*
- *The work of Plastics SA was also lauded, particularly their training initiatives*
- *SATAS certification is preferred to that of SABS due to better reputation for upholding standards*
- *The Installers Federation of South Africa (IFSA) is viewed as less experienced in fulfilling its mandate with respect to training provision*
- *Accreditation not all-round viewed in a positive light for reasons that include: perceived as a 'money-making business' and certificates being issued 'without sufficient testing',*

- *A lack standards for gas pipe manufacturing is bemoaned*

➤ **Installation / construction**

- *On-site quality controllers are fingered for lacking in basic plastic pipe-related knowledge and awareness*
- *'Superficial compliance' to and treating quality control as a 'rubber-stamping exercise',*
- *Ultimately, shortfalls not so much about the quality management systems per se but rather about the policing of compliance*

Business environment challenges

➤ **Exorbitant costs of doing business**

- *High electricity costs exacerbated by non-reliability of supply*
- *Organised labour issues – demanded rates of pay not aligned to market realities whilst industrial strike action leads to prolonged production interruptions which cost companies*

➤ **Racism as inhibiting factor to sector entry**

- *A new black entrant to the industry experiences the pipe manufacturing sector as being controlled by 'the old guard' who protect their market share jealously, which represents an obstacle for fledgling black owned businesses*

Government strategies and interventions

➤ **SME mentoring initiative**

- *Mining industry mentoring model for SMEs is lauded as a positive intervention aimed at upskilling and supporting new small companies*

➤ **Local content directives**

- *Local production and content regulations viewed positively by and large as it creates employment opportunities and assists with empowerment in the sector*

➤ **Economic revival through infrastructure development**

- *A decline in government tenders, reflecting a reduction in infrastructure spend, is widely bemoaned for setting industry back – attributed to factors like budget cuts or freezes, backlogs and misappropriated money / corruption*

Municipal water and sanitation piping systems

INDUSTRY RESPONDENT PERSPECTIVES

➤ **Generally sad state of infrastructure – in the face of overwhelming demand for water and sanitation services**

- *Tension in priorities between developing new infrastructure and maintaining and repairing the old water reticulation systems*
- *'Huge' project backlogs bedevilling critical water and sanitation services delivery*
- *Lack of basic plastic pipe (systems)-related knowledge*

- Shortfalls at the level of planning or prioritising and overseeing work
- **Compromised tendering / contracting**¹²
 - Tender processes/criteria and skills are often too narrow as to be limiting
 - Bills of Quantities lack specificity
 - Contractor expertise and experience outweighed by pricing
 - Pervasively entrenched corrupt tender/ procurement practices

LOCAL GOVERNMENT RESPONDENT PERSPECTIVES

- **Reasons for water and sanitation systems failure**
 - Leaks and pipe bursts as core factors – attributed by and large to vulnerabilities in ageing infrastructures, poor handling and treatment practices (laying of pipes) and insufficient understanding of pressure management
 - (Preventable) blockages in sanitation networks
- **Planning for infrastructure maintenance, repair and replacement**
 - All (sampled) municipalities subscribe to an information/ intelligence-driven approach and measures for identifying problem areas and prioritising interventions on a systematic basis
- **Factors inhibiting (proactive) response to infrastructure maintenance, repair and replacement priorities**
 - Operational budget shortfalls, with critical knock-on effects
 - Human & physical resources shortfalls
 - Bureaucratised and cumbersome procurement process
 - Quality management and control shortcomings

Competing in the market

- **Market / sector dynamics**
 - A shrinking, over-subscribed, low-margins, high-volumes market in which volume and price is (almost) everything
- **The underbelly of ‘competitiveness-as-price-war’**
 - Production costs and price-cutting through corner-cutting and, ultimately, specification-cutting in relation to materials usage (manipulation of polymer content), as a result of which sub-standard non-SANS mark-bearing products enter the market only to fail – and ultimately affecting the credibility of the entire sector
 - Contributing factors include:
 - ‘Value chain pressure’ on manufacturers,
 - New small enterprises that enter industry ‘on-the-cheap’ (due to low entry level) who can only compete pricewise, not at a technical level

¹² Industry respondents emphasised that such quality or process management failings are not only a problem at local government level but also in various industry sub-sectors, for example, the private open-cast mining sector.

- *Inadequate policing of standards/specifications compliance – regarding both manufacturing and installation*
- *Non-discerning distributors/retailers and end-users who only care about price*
- **Fundamentals that (ought to) govern competitive pipe-making**
 - *Producing at the ‘highest level of output’ to ensure enough quantity/volume to meet demand at any time.*
 - *Producing at the ‘highest tolerance levels’ to ensure compliance with manufacturing quality standards and product specifications, as proscribed by the industry authorities;*
 - *Using ‘as little material as possible’, on a ‘thinner-but-stronger’ basis, to enhance production efficiency and cost-effectiveness*
 - *(Technological and expertise requirements relating to above aspects are assumed to be in place)*

Diversification – products, services and market (sub) sectors

- **Products**
 - *Focus on the challenges or impediments to diversification in relation to capital expenditure, human resource capacity and ‘imaginative thinking’ capability constraints*
- **Services**
 - *Competitive advantage through turnkey business approach or model rather than just supplying pipe*
- **Market sectors**
 - *Volume-driven manufacturing self-limiting*
 - *Opportunities a-begging in non-traditional sectors like automotive, construction, packaging and gas*
 - *Growing market expansion into Africa but demand for South African products not a given*

Collaborative partnerships and initiatives

- **Critical role played by SAPPMA and Plastics SA**
 - *SAPPMA and Plastics SA are critical vehicles for bringing industry together and facilitating engagements to solve industry problems in aid of its strengthening*
 - *These two industry bodies are also credited for consistently collaborating with industry on issues involving industry inputs for developing training programmes or modules as well as participating in innovation forums*
- **Collaborative initiatives**
 - *Community empowerment through re-cycling (Plastics SA) and up-cycling (Sasol) projects lauded*
 - *Government support lacking*

Knowledge and skills shortfalls

➤ **General aspects**

- *Skilled prospective employees shunned*
- *Broad sectoral knowledge and experience lacking*
- *Insufficient trans-generational knowledge and skill transfer*
- *Reading and interpreting machine drawings*
- *Effective listening skills*
- *Grabbing (or not) opportunities*

➤ **Technical skills**

- *Artisans – knowledge and skills shortfalls regarding modern computerised pipe manufacturing machinery (maintenance), reading and understanding technical drawings, and fault-finding whilst the pool of suitably qualified and skilled artisans shrinking and ageing*
- *Technicians – reading and understanding technical drawings*
- *Specifiers¹³*

➤ **Extrusion**

- *Pipe-makers – serious shortage of experienced persons, like shift leaders, who understand the whole process of pipe-making in all its nuances*
- *Management – shortfall of (newly qualified black) managers who understand the process and the economics of the business*
- *Laboratory technicians – not sufficiently available*
- *Operators – no problems as enough training opportunities are available*
- *Welders – training in welding processes and techniques widely available and the rest is ‘merely following a recipe’.*

➤ **Client training**

- *SAPPMA and ‘historical’ companies – information provision on pipe-making and the importance of scrutinising Certificates of Conformance for pipes is commended by industry as an important initiative*

Research and development shortfalls

- *Very little, if any, industry-specific research occurs at company level*
- *Lack of research uptake in support of ‘doing things differently’*
- *Collaboration on product and material development limited to ‘reactive’ engagement by way of validating new products and materials (prototypes) from overseas suppliers/ manufactures for adoption by industry*

¹³ A **specifier** advises the entire project team, not just the design team. Specifiers coach teams about materials and product selections, applications, and integration required to make the project work. A specifier is a trusted technical adviser and part of the project team, from start to finish. <https://www.google.com/search?client=firefox-b-d&q=specifiers+definition>

- *In all, the low levels of (substantive) research and development in the industry is decried, with materials development neglect identified as an industry weakness*
- *Insufficient testing and quality facilities at a sector level*

Novel corona virus pandemic: impact and lessons learned

MICRO (company) level

➤ Impact on business

- *Mixed reports of the impact depending on sub-sector, for example, companies working the mining sector compensated a significant drop in demand for installations by way of an exclusive focus-shift to maintenance projects*
- *Conversely, most companies, unless they have pre-lockdown contracts in the bag, are merely surviving currently*

➤ Impact on staff

- *The psychological and emotional impact of the pandemic on staff was reportedly significant and some companies reported appreciation for greater sensitivity in understanding and managing staff in these times*

➤ Silver lining

- *Companies were forced to review and ‘re-set’ concerning structural organisation of company and how work takes place (performance-related efficiencies), for example, time- and cost-savings brought about by virtual meetings/ engagement*

➤ Lessons learned for the future

- *Financial sustainability – reserves to be always maintained, as opposed to relying on credit extension*
- *Organisational adaptation – need to devise strategies and practices to enhance organisational agility to be able to quickly adapt to market changes and issues*
- *Information and communication technology (ICT) applications – appreciation of the benefits-to-company of remote communication technology-based practices, regarding efficiency and cost-saving factors in particular*

MACRO level (sector and beyond)

➤ Impacts

- *Market ‘down and up’... but uncertainty about longer-term*
- *Disruption of or delays in raw material supply, particularly from East to West, impacted the entire pipe manufacturing sector by way of shortages and negatively impacting on stock management*

➤ Silver linings

- *Knock-on effect of company closures – the release for absorption into the sector of a pool of individuals with very good skill sets, like experienced operators*
- *Industry shake-up as many ‘bad apple’ companies will not have survived, regarding which a realignment towards quality production is hoped for*

- *It is hoped that with better awareness of health protocols there may be a concomitant commitment to clean water infrastructure and wastewater management*

➤ ***New normal***

- *Value chains – two points of view: no significant changes and value chain becoming shorter and more focused*
- *Market dynamics – reduction in the commodity environment and an increase in specialised products and service*

Respondent recommendations for strengthening industry

MICRO (company) level

➤ ***Attributes & practices making for a healthy and competitive company***

- *Lead by example – driven and committed*
- *Synchronisation*
- *Optimal production principles regarding ‘competitive pipe-making’*
- *Reputation development and nurturing*
- *Professionalism*
- *‘Progressive project methodology’ – adopt a systems approach to project design and implementation and build in efficiencies at planning and specification phases of projects*
- *Building a strong and happy team*
- *Business insurance*
- *Continuous organisational review (including product and service offerings) and adaptation,*
- *Improving evaluative and planning mechanisms and efficiencies*
- *Product and quality training*
- *Investing in specialised technologies*

MACRO level (sector and beyond)

➤ ***Countering corner-cutting / sub-standard manufacturing and installation***

- *Price regulation*
- *Increased and more effective policing of quality standards adherence*

➤ ***Growing the market***

- *Promoting plastic as material of choice for piping systems*
- *Optimising plastic pipe value chain:*
- *Improving quality management and control*
- *Benchmarking of testing facilities and promoting availability and access*

➤ ***Research and Development***

- *Materials development focus*

- **Government**
 - *Improve the environment for doing business*
 - *Deliver on annual promises regarding infrastructure development plans and imperatives*
- **Local Government**
 - *Strengthening municipal water and sanitation systems*
 - *Industry regulatory bodies to devise a 'standardised quality control methodology' to counter exploitation by unscrupulous contractors*
- **Industry machinery**
 - *Investment in modern machinery to promote innovation, efficiencies and pricing*
- **SOEs**
 - *Privatisation of key utilities to promote better expenditure and efficiencies*
- **COVID-related support by government**
 - *Working capital relief*
 - *Support with closing debtors' book insurance gap*
- **Collaboration**
 - *SAPPMA is best placed to provide a forum for engaging and networking role-players to solve industry problems and strengthen it*
 - *Finding common ground with respect to regulation and implementation to improve oversight and quality control represents a pressing need*
 - *The possibilities for collaboration go beyond competitiveness to such things as sharing of laboratories*
- **Training imperatives**
 - *End-user education*
 - *Extrusion – focus on management/senior level training to promote overall understanding of the extrusion process will have knock-on benefits further down the line*
 - *Municipalities – training to be provided to enhance understanding of all aspects involved in projects to ensure tenders are allocated appropriately and upskilling of staff responsible for infrastructure maintenance*

Letter of Invitation to participate in the research study (Company example)



Date

Name:

Job Title

Company:

Dear

INVITATION TO PARTICIPATE IN A RESEARCH STUDY

Plastic pipes are a vital infrastructure pillar in South Africa however the industry has seen negative growth over recent years with less than optimal machine utilisation in many instances. In response, the merSETA Plastics Chamber has commissioned a research study which is titled *“Improving the Competitiveness of the Plastic Pipe Sector in South Africa.”*

Correspondingly, the focus of this research will be on understanding the challenges facing the plastic pipe manufacturing sector. The study should make recommendations to the merSETA on possible interventions to improve the current negative position the sector finds itself in.

The study will focus on the differences between small, medium and large companies as well as a current and futures approach, inclusive of the impact of Covid 19 on businesses. Respondents will include the broader supply chain for pipe manufacturing, inclusive of manufacturers, suppliers, end users and R & D entities.

It was initially envisaged that data collection would take the form of in-depth face to face interviews with a cross-section of industry stakeholders and role players but due to Covid-19 restrictions on travel at this time, data collection will instead occur in terms of the following two modalities: (i) a short (on-line) electronic survey; and (ii) follow-up in-depth virtual interviews to supplement and enrich the first round survey data with selected companies, as may be required.

The researchers for this study are Ms Vanessa Davidson and Mr Carel Garisch, both of whom are familiar with the plastics industry makeup and dynamics.

Your business/organisation/institution is hereby invited to participate in this research project as your input will be extremely valuable to us in seeking to address the challenges facing the plastic pipe

manufacturing sector, inclusive of low levels of growth, machine under-utilization, low margins, a lack of technical upgrade as well as a lack of specialist skills in certain areas.

Yours sincerely 

H. M. Morapedi

Hosea Morapedi

Chamber Unit Manager
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merSETA Plastics Chamber Research 2020

Plastic Pipe Manufacturing Industry

SURVEY QUESTIONNAIRE

RESEARCH PURPOSE

Focus:

*WHAT CAN BE DONE TO IMPROVE THE COMPETITIVENESS OF THE
PLASTIC PIPE MANUFACTURING SECTOR?*

Objectives:

- Establish baseline picture of the challenges facing the plastic pipe sector value chain.
- Present a “futures” understanding of what can be optimised in the value chain to improve sector performance.
- Determine the current skills shortages, education and training provision and shortfalls.
- Establish what current R&D facilities contribute to improve the situation and what the best mechanisms would be for aligning industry and research efforts.
- Make recommendations on future (support) interventions to improve the situation.
- Establish the impact of the novel corona virus pandemic on the plastic pipe manufacturing industry sector and what (emerging) strategies and practices would enable pipe manufacturers to successfully respond (or not) to the crisis in the short to medium to long term (the ‘new normal’)

CONSENT

Through completing and submitting this on-line questionnaire, I agree to participate in a qualitative survey which forms part of a research project conducted by merSETA Plastics Chamber.

Furthermore –

- I understand that my participation is completely voluntary and that I may refuse to answer questions about which I feel uncomfortable.
- I understand that any information I provide is strictly confidential and that my privacy and the privacy of my company will be protected.

BIOGRAPHICAL DETAILS

RESPONDENT	Name			
	Position			
	Contact details			
COMPANY	Name			
	Size ¹⁴	Small	Medium	Large
	Core business			
	Geographical location	Province	Municipality (metro / district / local)	

PLASTIC PIPE MANUFACTURING INDUSTRY-RELATED ASPECTS

1. In an overall sense, what are the **key factors – micro and macro contexts** – which, in your view, **inhibit** plastic pipe manufacturing industry **competitiveness**?
2. How can the **value chain** in plastic pipe manufacturing and installation be **optimised** to better meet the supply and demand dynamics of the sector?
3. What improved **quality management systems** will assist in streamlining processes and procedures in the pipe system/product manufacture sector from design to installation and end user?
4. Can the sector diversify **product offerings** outside of the construction, mining and agricultural sectors?
5. What **new technologies, equipment** and **specialised skills** are required by the plastics pipe sector? And how could these be funded?

¹⁴ (*Department of Labour classification criteria: micro = 1 to 9 employees / small = 10 to 49 employees | medium = 50 to 149 employees | large = above 150 employees.)

6. Is there a shortfall / deficiency in **education provision** and, if so, what needs to be done to address the problem?
7. What **mechanisms** can be instituted to **optimise** existing **R&D** facilities and add value towards more market pull (bearing in mind that R&D on polymers is by-and-large not feasible for pipe manufacturers as it could comprise up to 75 percent of total product cost).
8. What key **changes and initiatives** – sector-wide and at company level – do you think are required to **strengthen** the plastic pipe manufacturing sector and make it **more competitive**?

IMPACT OF AND RESPONSE TO THE CORONA VIRUS PANDEMIC

Concerns for plastic pipe manufacturing companies in regard to COVID-19.

9. What are the **top three issues of concern** for your company in regard to the actual or potential adverse impacts of the corona pandemic – with reference to both **internal (micro) and external (macro) environments**?

Concerns		Top 3
1.	Not having enough information to make good decisions	
2.	Decrease in consumer confidence reducing consumption	
3.	Cybersecurity risks	
4.	Potential global recession	
5.	The effects on our workforce / reduction in productivity	
6.	Supply chain disruptions	
7.	Difficulties with funding	
8.	Fraud risks	
9.	Financial impact including effects on results of operations, future periods, and liquidity and capital resources	
10.	Impact on tax and trade	
11.	Privacy risks	
12.	Reduced capacity of government to fulfil promised expenditure on infrastructure after Covid-19	
	Other issues? (please specify below)	
12.		
13.		

10. Has your company **experienced** any of the following during national **lockdown**? (Select top 3)

1.	Successfully accessed government financial support other than TERS/ <u>UIF</u>	
2.	Cutting capital spending to support operations	
3.	Outsourcing corporate functions (e.g. shifting non-core functions to contractors)	
4.	Retrenchment of staff	
5.	Non-payment of suppliers	
6.	Significantly reduced market demand	
7.	Cash flow liquidity issues	
8.	Considering liquidation/company closure	

Responding to the novel corona pandemic (company level)

11. What are your thoughts on **'best practice' strategies and practical steps** – strategically, organisationally, systemically and operationally – that companies should adopt in responding to the pandemic **in the short, medium and longer term** in order to survive and indeed also develop sufficient 'agility capacity' to regain a competitive edge in a new-normal environment?

(Under each heading, please arrange responses in order of **priority**)

SHORT term:	
1.	
2.	
3.	
4.	
5.	
MEDIUM term:	
1.	
2.	

3.	
4.	
5.	
LONG term:	
1.	
2.	
3.	
4.	
5.	

12. What are the implications for **new and/or specialised skill set requirements**?

13. Do you think **South African pipe manufacturers** have **responded** to the corona pandemic **differently to global competitors**, and if so how?

What to expect after the pandemic?

14. In your view, what features or fundamental changes are likely to define the post-pandemic '**new normal**' environment as regards the plastic pipe manufacturing industry; with particular reference to possible changes in the:

- a) nature of **value chains**?
- b) **market** dynamics?
- c) collaborative **partnerships**?

THANK YOU!

merSETA Plastics Chamber Research 2020
Plastic Pipe Manufacturing Industry

INTERVIEW GUIDE

Research FOCUS:

What can be done to improve the competitiveness of the plastic pipe manufacturing sector?

Research OBJECTIVES:

- Establish baseline picture of the challenges facing the plastic pipe sector value chain.
- Present a “futures” understanding of what can be optimised in the value chain to improve sector performance.
- Determine the current skills shortages, education and training provision and shortfalls.
- Establish what current R&D facilities contribute to improve the situation and what the best mechanisms would be for aligning industry and research efforts.
- Make recommendations on future (support) interventions to improve the situation.
- Establish the impact of the novel corona virus pandemic on the plastic pipe manufacturing industry sector and what (emerging) strategies and practices would enable pipe manufacturers to successfully respond (or not) to the crisis in the short to medium to long term (the ‘new normal’)

Consent

I agree to participate in this interview which forms part of a research project conducted by merSETA Plastics Chamber.

Furthermore, I understand that –

- my participation is completely voluntary and that I may refuse to answer questions about which I feel uncomfortable.
- any information I provide is strictly confidential and that my privacy and the privacy of my company will be protected.

Biographical Details

RESPONDENT	Name			
	Position			
	Contact details			
COMPANY	Name			
	Size ¹⁵	Small	Medium	Large
	Core business			
	Geographical location	Province	Town / City	

Plastic Pipe Manufacturing Industry-Related Aspects

1. In an overall sense, what are the **key factors** in regard to the **micro** (company) and **macro** (sector & beyond) contexts which, in your view, **inhibit** plastic pipe manufacturing sector **competitiveness**
2. Correspondingly, what **remedial changes or initiatives** do you suggest for **strengthening the sector**?

Response to the Corona Virus Pandemic

3. What are your thoughts on '**best practice**' strategies and practical steps that companies should adopt in **responding** to the pandemic in order to **survive** and indeed also regain a **competitive edge**?
4. In your view, what features or fundamental changes are likely to define the post-pandemic '**new normal**' environment as regards the plastic pipe manufacturing industry?

¹⁵ (*Department of Labour classification criteria: micro = 1 to 9 employees / small = 10 to 49 employees | medium = 50 to 149 employees | large = above 150 employees.)



merSETA Plastics Chamber Research 2020: **Plastic Pipe Industry**

INTERVIEW GUIDE

Local Government Respondents

Research Purpose

In view of the plastic pipe industry sector having experienced a downturn in recent years, the merSETA Plastics Chamber has commissioned a research study with the overall focus on gaining an on-the-ground understanding of the challenges facing the sector and coming up with recommendations as to what can be done to strengthen and improve the competitiveness of the sector.

Accordingly, the research team is hoping to obtain broad-based inputs – by way of either virtual or in-person interviews – from all role-players and stakeholders who are directly or indirectly associated with the plastic pipe industry sector; whether manufacturer, supplier, contractor or *(local) government official involved with infrastructure projects.*

Interview Focus

Themes explored with industry respondents span all plastic pipe sector value chain dimensions. Themes framing the discussions with local government/municipal respondents largely focus on infrastructure projects pertaining to water and sanitation

pipng systems, covering aspects like their design, planning, installation, maintenance and repair – with an extended focus on relevant knowledge, skill and expertise across all categories of municipal and contractor functionaries.

Consent

I agree to participate in this interview which forms part of a research project conducted by merSETA Plastics Chamber.

Furthermore, I understand that: (i) my participation is completely voluntary and that I may refuse to answer questions about which I feel uncomfortable; and (ii) any information I provide is strictly confidential and that my identity and the identity of my workplace will be protected.

Topics for discussion

INTRODUCTORY NOTE:

The discussion is framed or guided by topics that emerged from interviews with industry representatives in specific regard to reflecting on their experiences in engaging / dealing with the local government / municipal sector across different contexts (supplier, contractor, consultant, etc.) with respect to bulk water and sanitation infrastructure.

Though the 'tone' of discussion topics may appear overly critical or negative, great care was taken to keep interviews with the industry representatives constructive in focus and we welcome your balanced views on the perceived challenges.

1. *Reasons for backlogs in implementation of approved infrastructure projects* – i.e. designed, put to feasibility, planned and budgeted – amidst huge unmet demand for potable water provision and sanitation services
2. Against the backdrop of alarming levels of municipal water system leaks, the key (installation-related) *factors responsible for infrastructure projects not being*

implemented as designed and planned in regard to quality specifications (products and services), with piping system failure as result

3. Nature and impact of engineering skills and expertise shortfalls in respect of *maintenance and repair* of water and sanitation systems / infrastructure, with specific reference to:
 - executing *preventative maintenance* protocols and practices
 - *overseeing/managing* the *process* of repairing or replacing old infrastructure
4. *Infrastructure development priorities* biased in favour of new infrastructure projects, that is, to the detriment of maintenance and repair of existing ('old') infrastructure.
5. *Suggestions for remedial changes or initiatives* to improve the quality and sustainability of municipal water and waste piping systems

The primary role of government in creating an enabling environment for business / industry to thrive

Despite the current challenges, government has in recent years undertaken a number of interventions to stabilise the industry:

- Support for competitiveness through MCEP (Manufacturing Competitiveness Enhancement Program) and MSP (Manufacturing Support Program) programmes administered by the dtic
- Trade support through tariff adjustments, rebates and trade remedies administered by ITAC (International Trade Administration Commission of South Africa)
- Development of risk engine to deal with mis-declaration, under-invoicing etc
- Designation of products for public procurement
- Support for companies in distress through IDC funding.

¹⁶ Provided by Ms Thokozani Masilela via email in response to a request for stakeholder comment on the final draft of the report