

7.1 Introduction

What exactly is meant by the now ‘well-worn’ phrase ‘from mind to market’ is, potentially, open to widespread interpretation and is a term that is common to many different manufacturing sectors. However, for the most part, it is acknowledged as the process whereby the manufacturer transforms the concept or specification communicated to him by the designer into a physical commodity, usually by way of an initial prototype, which upon approval, is then manufactured in quantity and transported to the point of sale for ultimate purchase and utilisation by the end consumer.

When we focus on the retail apparel sector and, specifically, on the management and communication of colour from ‘mind to market’, we are typically describing the process whereby textile designers collate their target colours and then communicate their colour requirements to the supply chain, usually in the form of a request for a physical sample or ‘lab-dip’. Once this ‘pre-production’ sample is approved, the manufacturer is usually requested to submit a sample from their first production run before managing ongoing production in line with the retailer’s requirements. Garment assembly and transportation to warehousing followed by final despatch to the ultimate point of sale, whether that be a ‘bricks and mortar’ retail environment or transactional website, completes this cycle.

The above is an oversimplified version of events and is very specific to the management of colour within the cycle; there are many other parallel processes that take place before, during and after, which, as well as adding value to the final product, introduce additional players, complexity and, inevitably, time and cost. However, these increments, together with the colour sampling process itself, are ‘necessary evils’ and are business critical to any reputable retailer in today’s worldwide market place.

This process was always challenging to manage even in the ‘good old days’ when retailers were able to source significant volumes of merchandise from manufacturers in relatively close proximity to their headquarters. Nowadays, the onset and explosion of global sourcing, which is here to stay,

has introduced numerous additional complications including cultures, language barriers, time zones, technical expertise, capacity issues and additional ‘players’ to name but a few.

Communication is intrinsically linked to all of the above and ineffective communication, especially on colour, has severe ramifications in terms of time, cost, quality and overall profitability to today’s apparel retailers. It is precisely for this reason that the proactive and farsighted retailers in today’s market are closely and continually examining the information flow within their value-added chains, and have already taken steps to utilise the latest ‘digital’ tools available on the market to help them to communicate colour and its associated information more effectively.

This chapter will examine the importance of colour within today’s retail environment and, critically, review historic and current practices for colour communication between the specifier and the supply chain. This will be followed by an analysis of current ‘best practice’ in the chain, together with the associated impact and benefits and will conclude with a proposed forecast of how colour could be managed in the future.

7.2 The ‘fast fashion’ concept and its effect on colour

‘It’s a changing world’ so they say and one major paradigm shift over recent years has been the change in how the ‘typical average consumer’ shops for clothing. It cannot be denied that, without really recognising it ourselves, our shopping patterns have changed beyond all recognition over the past 5–10 years. So what *has* changed?

When we shop

As a direct result of increased Sunday trading, extended opening hours and public holidays, we are now shopping more often than in previous years – for better or for worse, our ‘shopping’ window has enlarged considerably.

How often we shop

The massive explosion of the so-called ‘value sector’ in recent times, together with a significant improvement of the product offer, has made us much more value conscious and has also encouraged a more regular and increased average purchasing volume (though not necessarily an increased average financial value/spend).

Where we shop

The ongoing proliferation of ‘out-of-town’ shopping centres and ‘outlet malls’ has opened up a world of opportunity and choice to us. When

supplemented with the now mandatory and varied eating and entertainment options, this becomes a major value-added shopping experience in stark contrast to the traditional 'high street' experience.

Online shopping continues to grow in popularity and will continue to do so as our leisure time is increasingly at a premium – vendors are now achieving much higher levels of customer satisfaction due to improved user interface, choice, fulfilment and security, and are reaping the rewards.

However, the sector with unprecedented growth has to be the supermarkets and the phenomenal rise in non-food sales, especially in clothing. Enticed by the 'one-stop' opportunity but predominantly the value of their offer, these operators are growing at a phenomenal rate, confirmed by the recent establishment of George at Asda as the UK's No. 1 clothing retailer.

A combination of all of the above has introduced a significant amount of additional competition in what was already a fiercely competitive market and this has been compounded by the advent and expansion of international retailers outside of their regional core markets.

At the same time, and partly as a result of the above, generally we have become much more demanding and sophisticated shoppers, expecting and demanding increased choice and value. However, the most significant behavioural shift has been our average frequency of purchase, which has come down from approximately 3 months to an average of around 6 weeks. Given this, we naturally expect a new product offer every time we enter a store, and the retailer without such an offer seriously diminishes the sales prospects. Whether this phenomenon was consumer or retailer driven is subject to debate but this scenario undoubtedly gave birth to the concept of 'fast fashion' as we see it today. The traditional 'four-season approach' is long since gone and this has been recognised and confirmed by insightful and very successful players such as Zara, H&M, Top Shop, New Look and George to name but a few.

However, fast fashion for the retailer has a myriad of associated considerations including design, product development, sourcing, merchandising and logistics, and all of these naturally become more challenging as the supply chain becomes more disparate. Having said that, one common strand throughout the entire process, and the most important decision influencer at the point of sale is *the right colour*. More and more retailers are now realising that the right colour in the right place at the right time is absolutely business critical, whether this be as a means of differentiation or even for long-term survival!

This is 'easier said than done' and is certainly not achievable using the traditional business models employed historically. Inevitably then it begs the question 'How is colour typically managed in retail and where are the areas for improvement?'

7.3 Colour palette development as part of the whole product development process

The starting point for the whole colour development cycle is the composition of the colour palette itself and, *typically*, it will involve the following generic steps: (*The frequency and approach to this exercise will depend upon the product offer and business model of the individual retailers.*) Initially, design teams visit the regular worldwide fashion exhibitions and shows to review the forecasted designs, themes and colour trends and collect physical representations of the same. Additionally, shopping trips to competitors or aspirational brands are undertaken and samples of popular colours and designs are either purchased or visualised. This information can then be supplemented by information from dedicated trend prediction service companies and the traditional colour atlas providers such as Pantone, NCS, Scotdic, etc.

Normally, this information is then assessed and translated on to physical storyboards in order to select, group or filter the colours/themes during selection meetings, either on a departmental or on a total company basis. The composition of this initial palette will usually include a combination of fabric swatches, pieces of yarn or thread, magazine tears or other printed material and maybe samples from colour atlases. Purely from a colour perspective, the objective at this stage is to consider both individual colour and colour combinations, with additional or parallel discussions taking place on how these colours will then be translated into the selected designs and into the final merchandising offer.

The initial palette is then prioritised and streamlined and then, depending on the retailer, the presentation of the palette could be aesthetically enhanced by matching the palette to a CAD printout, colour atlas samples or, occasionally dyed samples from selected suppliers. From a design perspective, for many retailers, this is normally the cutoff point in responsibility. The palette has been creatively thought out, discussed and composed, yet very little consideration, if any, has been given to the technical feasibility of the palette on production substrates. This is typically considered to fall under the auspices of the QC, product development or technical department and, probably, rightly so. This verification process is usually achieved by way of the sampling or lab-dipping process via the supply chain; however, as will be discussed in later chapters, the quality (or lack of) of the original target palette, plus the need for the design team to design and approve such samples with limited production experience, has a number of inherent disadvantages.

The collation of these concept colours is usually done some 12–18 months in advance, and sometimes even longer ahead, and this is usually as a direct result of the length of the product development cycle prior to getting goods

in store. Given the observations in the previous section and the fact that opinions and trends can change dramatically within such a timeframe, this is a far from an ideal situation.

There is a strong demand and need for just-in-time palette selection and production commitments, together with improved in-season flexibility, and this is very do-able with the latest digital tools and processes. Some retailers are already experiencing such benefits yet there are many more who aren't and, in order to do so, they must critically examine their existing processes as we discuss in the next chapter.

7.4 Review of existing 'manual' communication methods between design and production and why things go wrong

For the purpose of this chapter, in order to illustrate the worst-case scenario, the author will be using a retailer with no formalised colour management procedures or instrumental systems as a case study example. There are a large number of major retailers who do have well-established colour management programmes and this number is increasing but, at the same time, there are at least an equal number that have no programme at all.

So now we have the situation where the QC or product development team have received a physical palette from design and have been instructed to translate this into physical fabric swatches (lab-dips) via the supply chain. The main objectives are to assess if the designed colour is achievable on the selected substrates, to have a reference point for ongoing production and, finally, to convert the initial palette into a more presentable format that can be used as an ongoing tool for further design, merchandising and selection discussions.

The first challenge is to obtain sufficient quantities of each target colour to distribute to the supply chain in multiple locations and to a chain that typically will include numerous offshore offices, agents/vendors, garment makers, dye/mills and trim/accessory suppliers. This is normally achieved in three main ways:

1. via a verbal description – 'give me a red';
2. by cutting the original sample (assuming it is large enough) into many pieces and posting it out to the first recipient in the chain;
3. By matching the palette to the closest reference in the preferred colour atlas and quoting this to the supply base.

Once the preferred method is determined, the colour requests are distributed with instructions on the retailer's expectations in terms of physical performance parameters but, crucially, only with very broad-based

instructions on colour performance, i.e. 'give me your best visual match'. A deadline for submission is also included which, again, is normally quite a short timeframe. This package of information works its way down the value-added chain, with each player taking their piece of the original 'target' for reference and the dyeing, finishing and submission procedure begins.

It is widely acknowledged that this is a very iterative process, necessitating multiple submissions, discussions, deliberations and confrontations, not to mention a very considerable amount of unnecessary time, cost and energy. So, why is this the case?

The answer will vary from company to company and will be influenced by the method of colour target delivery; however, the major cause is undoubtedly the very subjective nature of the whole process.

As will have been explained extensively elsewhere in this volume, our personal interpretation of 'give me a red' as a starting point will vary widely due to the many internal and external factors that affect our colour perception. This applies equally to our assessment of the relative difference between two samples once a 'lab-dip' has been produced – an issue that is further compounded by a complete lack of information on the customer's expectations in terms of a numerical tolerance for matching and the conditions and illuminants under which the colour is to be matched. Given these multiple factors and considerations, and the absence of any guidelines to manage them, it should be of little surprise that this is a very frustrating and protracted process.

The provision of a physical target rather than a verbal descriptor is a step forward but is a long way short of ideal. Many retailers do not understand that the starting point for a dye-mill to begin the dyeing process (using a standard computerised match prediction system) is either to measure the original target with a spectrophotometer or to input the reflectance data for the sample.

If the physical target is so small that it cannot be measured when it eventually arrives at the mill, the operator has to resort to manual and subjective colour matching by eye, the serious ramifications of which are mentioned above. Even when the target is large enough to be measured, there are still many variables present in terms of the age and reliability of the spectrophotometer, the relative differences between different makes and models, the measurement technique and sample presentation of the operator and the environment in which it is measured.

Additionally, targets are occasionally supplied on non-textile substrates such as paper and plastic, which present an additional complication in terms of both feasibility and stability, particularly when the supplier is required to match under more than one illuminant. The absence of clear and comprehensive instructions for matching from the customer also applies equally to this situation.

In light of the above, it is little wonder that, during this initial sampling phase, each supplier potentially has an individual, independent target (which could vary widely from the original) and this issue becomes more serious when we enter into production. Typically, the approved lab-dip becomes the ‘working standard’ for production and, in taking this standard, we have already moved quite some way from the original target during this phase. Each supplier then has *their own* ‘working standard’, which is compounded further still during production – a scenario that is virtually impossible to manage within a reasonable timeframe. And it gets worse . . .

Inadequate targets and guidelines are compounded by a general lack of knowledge and experience of both colour and production techniques (to varying degrees) at the retailer, the offshore office, the agent/vendor and the garment maker.

Each of the aforementioned has their historical and specific area of expertise but typically this does not extend to colour and dyeing and finishing. General observations include the following.

- The colour approval task is non-value added, though a necessary evil, and is therefore typically delegated to junior staff members (usually in buying positions) with limited experience and colour knowledge. Staff are rarely checked for colour blindness or colour discrimination skills and there is also quite a high staff turnover rate in such positions, resulting in a lack of consistency and focus.
- Colour approval is also usually a decentralised and departmental function, causing a lack of cohesion, consistency and informed comment. (The lack of such experience can apply equally to design or other commercial personnel at various stages of the chain.)
- Colour approval is performed on a very subjective basis – at best using a lighting cabinet, and at worst, at the desk under variable and various viewing conditions.
- On the occasions when a lab-dip does fail, feedback is given to the supplier in very non-specific terms, i.e. ‘make it bit warmer’ – again very subjective and the supplier has little chance of making sense of this. He/she has to try and interpret the requirements of the customer on a ‘best guess’ basis.

As was mentioned previously, the end-result of all of the above can be summarised as follows:

- multiple submissions for approval;
- frequent debates or confrontations often necessitating crisis trips for resolution;

- lead-time extension and production delays in a critical path with very little margin for error;
- increased costs in terms of man-hours, time and courier fees;
- the inevitability that off-shade colour may be accepted in order to achieve in-store deadlines, hence a deterioration of the product and brand.

So what can be done to address these issues ... ?

7.5 Best practice in communicating between design and production – human and technological considerations

The concept of instrumental colour management is not a new phenomena – far from it! The technology in its earliest form has existed in the supply chain for over 30 years and its application in the retail industry was pioneered by Marks & Spencer in the 1980s. Since this time, the use of the technology has exploded on a worldwide basis and is now common-place in the dyeing and finishing arena as well as becoming a much more common tool for the world's leading retailers and brands.

What is relatively new is the *increase* in the uptake and adoption of the technology by a larger number of major worldwide retailers who are realising that they need to re-assess and change their colour business models in order to compete and survive. At the same time, we are seeing increased utilisation of the latest digital and electronic colour communication tools by the earlier technology adopters in order to meet the demands of today's fiercely competitive and fast fashion-driven market.

When looking at the worldwide apparel retail market, we see a dramatic variation in the levels of technology uptake and, whilst many proactive retailers are already working their way along the technology life cycle from introduction through the modification and maturity stages, there are a significant number of retailers and brands that have yet to jump onboard. This chapter aims to mention all of the various tools and processes that are currently available with a view to suggesting a 'best practice model for retail' to which current and prospective users alike can aspire. As well as looking at the individual solutions, suggestions on potential applications for this technology will be examined, together with a summary of the potential associated benefits. At the same time and equally importantly, we will cover the associated human issues because, as we will see, the latest tools are only as good as the people managing and utilising them and the processes and structures that surround them.

7.5.1 Palette development

Technological opportunities

In addition to the very manual ‘storyboard’ process described in section 7.3, other tools employed during the palette development phase include:

- traditional entry level design packages (Photoshop, Freehand, etc.);
- existing CAD solutions with additional functionality and scope;
- physical colour order systems.

Each of the above has its own merits and limitations and they will continue to be popular with retailers as an aid to palette development. However, one potential area for improvement is the ability to move away from a purely physical form of palette development, whereby a physical (usually printed) target is used as a reference, and one that provides RGB data only, which the supply chain find difficult to translate and work with.

Alternative solutions offering ‘precise-colour on a calibrated screen’ design capability have been commercially available for the past 8 years or so and include the Envision (Imagemaster) product from Datacolor. More recent product offerings include Lectra’s Colour Management Module which, when used in combination with existing design solutions, offers the user calibrated monitor and printer technology, together with the ability to design the palette electronically and output the reflectance data for the palette, which can be electronically communicated and utilised by engineered standards providers and the supply chain itself.

Such systems offer considerable added value over and above basic ICC profile monitor and printer calibration, as well as the potential for seamless integration of colour data between the design and QC functions. Here is a selection of practical applications currently in use.

- Palettes are created electronically on-screen using a spectrophotometer, electronic colour libraries or in-built colour creation tools.
- Assess the colour on ‘flat tiles’, on fabric swatches or on full garments.
- Use as a selection and merchandising tool on screen and on printer.
- Print out virtual lifesize garments.
- Assess the colour under different illuminants.
- Match trims and accessories electronically in advance.
- Print out the colours in true calibrated colour for discussion meetings.
- Output the colour in reflectance data format to standards provider, internal departments or supply chain.
- Archive and retrieve colour standards and associated data electronically.

Through the use of this technology, the following commercial benefits can accrue.

- Palettes can be designed in a fraction of the time.
- A much more flexible and creative tool is available – no need to compromise on colour due to ‘best can find’.
- Better and more informed decisions can be made earlier in the process.
- Feedback on colour feasibility can be gained much earlier without the time and cost associated with physical sampling.
- Colours that don’t work can be identified and numbers of requested samples can be reduced.
- Massive sampling costs/time for swatches and garments can be reduced.
- Rationalisation of palette – colours can be shared between departments and historic standards and colour libraries can also be searched to prevent duplication and reduce cost and time.
- A much more exact science is available – meaningful palettes can be delivered to QC and the supply chain.
- Communication can be improved with the supply chain and approval rates improved.

Human considerations and caveats

One of the biggest challenges that retailers face in this particular area is making design teams aware of the effect that misinformed colour decisions have on their colleagues in production and onwards into their supply chain. Whilst it is clear that design will accrue many benefits via the adoption of the latest digital tools, they must appreciate that as much benefit, if not more, will go to their colleagues in the product development area. They must not see the completion of the creative physical palette as their responsibility cut-off point.

For this to be understood and implemented, there needs to be a ‘buy-in’ at the highest level, that the collective corporate benefit is more important than that of the individual business unit.

The shift to working electronically with design in this way can be a significant culture shock and realisation of this at an early stage will help address resistance and concerns further down the line. It does require an open-minded and flexible working approach for all concerned if the company is to overcome the typical (sometimes unwritten) objections of:

- *‘I will always need something to touch and feel.’*
- *‘Designing colours on screen is a degradation of my creative flair.’*

- *'I can't trust what I see on the monitor.'*
- *'I am not being sufficiently creative if I am re-using colours we have used before?'* And so on . . .

A phased period of implementation is always suggested to 'bridge the gap' and to get people comfortable with a new way of working; a semi-technical person to forge closer links between design and production always helps during this transitory period.

The change requires commitment from all concerned and a stark realisation that, when we talk about reducing colour associated lead-times, there is as much change required in design as there is in production. The rewards are more than worth the effort and change is essential to survive – it is good for a business to be 'design led' but being 'design controlled' is another matter completely!

7.6 Creating the standard

For companies with established colour management programmes, once the palette has been given final approval by the design team, it is typically 'handed off' to quality control/product development to transform this into a set of 'engineered standards' for onward distribution to the supply chain.

But what is an engineered standard?

An engineered standard is a dyed piece of fabric, usually cotton, supplied with a set of reflectance data for that particular colour mounted on a piece of card and this is a service supplied by dedicated companies or the major dyestuff suppliers. The standard should clearly state that the reflectance data must be used as the starting point for the dyeing process either via keyboard input or via electronic importing and that the physical swatch is there as a visual reference only and under no circumstances should the fabric be re-measured for matching. Instructions for matching, handling and storage are normally also provided as is a recipe for the colour (though this is more often provided upon request if a supplier is experiencing difficulties matching the shade using his normal dyestuff combinations).

The starting point for this process is receipt by the standards provider of either a physical reference supplied by the customer or an electronic palette sent in via email from the aforementioned design or QC systems. Submissions are sent back to the customer again either physically or electronically until approval is given, upon which sufficient lengths of the fabric are dyed and conditioned. 'Master' measurements are then made either on the customer's or standards supplier's spectrophotometer and the resultant reflectance data is then transferred on to the printed standard cards and stored for electronic delivery.

7.6.1 Commercial benefits

The use of engineered standards has a number of associated benefits in its application:

- They are a supremely objective and accurate definition of the original target colour for matching.
- They enable every player in the supply chain to begin colour matching at exactly the same point by instructing the use of reflectance data only as the standard.
- Via dialogue with the standards supplier and by utilising their experience in colour formulation, colour targets/recipes are verified for feasibility in terms both of performance parameters and colour matching in multiple illuminants on multiple substrates.
- In this way, the retailer can be assured that the target is achievable and prevent 'best can do' responses from the supply chain.
- Greater utilisation of electronic tools to specify, manage and communicate colour during this process presents major speed, cost and quality opportunities.

7.6.2 Human considerations and caveats

The development of engineered standards undoubtedly presents an additional financial, and also time, consideration to the design environment, who have traditionally employed a 'least cost' approach to this subject. However, as mentioned at length in previous chapters, the root cause of all the major issues associated with multiple colour submissions and major time delays resides with the inaccurate specification of the target at the beginning of the process. The additional cost and time associated with the use of engineered standards is offset many times over by the dramatic reduction in the number of supplier submissions, together with the associated lead-time, cost and quality improvements. To realise these benefits, it is absolutely essential that a 'total process' viewpoint is foreseen and adopted by the retailer, rather than a potentially divisive departmental approach which could block such initiatives and opportunities.

7.6.3 Delivery of the standards to the supply chain

Once sufficient quantities of the engineered standards have been produced, the retailer is then challenged with the onward distribution. This will vary between retailers but would typically involve offshore sourcing offices, agents/vendors, garment makers, dye mills and trim and accessory manu-

facturers. Each player at each stage will want to maintain a reference and, particularly at the agent or garment maker level, additional new players – usually dyemills who are not usually visible to the retailer – will be introduced, necessitating further copies of the standard.

The most important recipient in all of this is the company that is physically dyeing the fabric, as it is the reflectance data that is the precursor to the match prediction and entire sampling process. It goes without saying that it is equally important for all associated players to refer to the same original standard throughout the sampling and production process and this should be the original standard not the *first approved lab-dip*.

Given the not insignificant number of companies involved in the process, the associated distribution costs of physical delivery, as well as the associated time lag, are considerable. Some companies choose to accept and absorb this cost, yet there are other retailers who have been actively reviewing and amending their distribution methods in order to minimise these issues. The following options are utilised to varying degrees.

1. Suppliers are charged for each physical standard they order.
2. Electronic or digital standards (reflectance data only) are delivered to the supply chain either via email or via the retailer's website (via password access) on a free of charge basis. Physical standards are chargeable.
3. The entire standards production and distribution service is 'outsourced' to the standards provider and the supply chain download or purchase standards directly.

Human considerations and caveats

The 'passing-on' of this cost from retailer to supply chain is potentially a subject of debate. However, in practical terms, it would appear that the supply chain would prefer to absorb this cost in the knowledge that they are receiving a true and fair standard that they are capable of matching, rather than a moving and unrealistic subjective target necessitating multiple submits and unnecessary time and cost.

'Is an engineered standard all that I need to get good colour matching?'

The answer to the above question is a resounding no!

Engineered standards are only as good as the instructions and customer expectations that go with them. An absolute prerequisite to any retailer beginning a colour management programme is a clear and comprehensive set of instructions, usually in the form of a dedicated colour quality manual, explaining in detail their exact requirements. Amongst others, this would typically include instrumental tolerances

and settings, sample presentation and measurement techniques and sample submission procedures. In the absence of this, and in the absence of a clear understanding of the messages by the supply chain, chaos will reign!

7.7 Colour approval – where is it done?

One potential best-case scenario answer to this question would be:

‘As close as possible to production so that corrective action can be taken as quickly as possible as and when things go wrong.’

However, retailers vary considerably in their sourcing operations and structures and, as a direct result of this, we see very different approaches to colour approval in the retail market. In section 7.4 we studied in detail the major disadvantages associated with decentralised or departmental colour approval on a purely visual assessment basis. In this section, we will examine the structural, as well as the process issues, associated with best practice alternatives.

Scenario A: An instrumental QC system utilised by many departments at the same Head Office location.

Summary A much more accurate and repeatable process than pure visual assessment but there is potential for inconsistent decisions due to the large number of users, plus significant logistical and training issues. Colour approval is still not a high priority task plus suppliers are normally still sending physical samples long distances with associated time lags.

Scenario B: A centralised colour department with an instrumental QC system

Summary A more accurate, repeatable and consistent process due to focused and production/colour experienced users. Borderline issues are discussed and resolved more easily and colour approval is the primary role of the department. However, potentially suppliers are still sending physical samples long distances with associated time lags.

Scenario C: Colour approval is executed at offshore offices in close proximity to the supply chain

Summary Though this requires additional capital investment and training, all of the above benefits prevail, plus the ability to significantly improve

lead times due to proximity to supply chain and ability to respond quickly when issues occur.

Many retailers continually strive to make their suppliers more 'colour accountable' and this is a noble cause. The most important colour decision is the one that is done 'at source' and the retailers have a right to expect that submissions that do not meet predefined criteria should at least be minimised and, at best, eradicated completely. This does require time and is very much a two-way process with a number of caveats; however, it is more than do-able given sufficient focus and emphasis, and the rewards speak for themselves.

7.8 Colour approval – how is it done?

A growing number of the world's larger retailers have recognised the many deficiencies associated with the purely visual method of colour evaluation and have taken steps to implement instrumental colour measurement within their process.

The extent of implementation varies considerably and this is a constantly evolving process with equal consideration given to the logistical issues (i.e. where the decision is taken as described above) as well as the technological consideration of how the decision is taken. This section will examine the steps to progression and consider the existing technology currently utilised by the world's leading retailers and brands.

7.8.1 Instrumental evaluation of physical submits

The first step is the implementation of an instrumental QC system to measure and assess physical submits from the supply chain. The original standards are stored and retrieved electronically and the lab-dip or production sample is measured on to the system and assessed for compliance against the established numeric tolerance. Visual evaluation of the submits in a lighting cabinet is also performed and a pass/fail decision results, which is subsequently communicated to the supplier. On occasions where the submit fails, guidelines for corrective action are provided in specific objective production-based terminology.

Assuming good levels of operator training, engineered standards and a comprehensive colour manual, this makes for a very accurate and consistent process; albeit one which is limited by the requirement for the samples to be supplied and returned on a physical basis, i.e. by courier post with the associated time and cost implications.

7.8.2 Instrumental evaluation of electronic submits in QC programmes

The worldwide application and acceptance of email and Internet connectivity has opened up significant opportunities in the field of electronic communication at a time when the distance between the retailer and their supply base is becoming wider and wider. None more so than in the field of colour where the need to physically handle and assess colour submissions is negated by the ability of the dyemill to make a measurement and send it to any designated location worldwide in a matter of seconds.

This is admittedly an oversimplified version of events and is subject to a number of caveats such as:

- ensuring that the sample has been measured in the correct manner and under the correct conditions – usually effected by way of supplier audits or accreditations;
- ensuring correct levels of inter-instrument agreement between supplier and retailer such that the report the supplier sees in Sri Lanka corresponds with the report that the retailer see in Europe.
- making sure that the email attachment that has been sent can be opened and utilised by the recipient system in the same file format.
- and finally, getting people to trust the remote measurement that has been made in place of a physical sample that they have historically insisted upon and sought comfort with.

Though these are legitimate issues demanding due consideration, they are easily addressed, given an open mind and organisational focus. Many of the early adopting apparel brands have been enjoying the massive lead time, cost and quality benefits that are available through such an electronic programme for some time. Moreover, given the ever-shortening development timelines that retailers are working to nowadays, such programmes are an absolute ‘must-have’ if they are to maintain their future competitiveness.

7.8.3 Instrumental evaluation of electronic submits using ‘true colour on screen’ solutions

A further enhancement, and an increasingly popular addition to existing electronic communication packages, has been the introduction of ‘precise colour on calibrated computer monitors’ systems such as Datacolor’s ‘Envision’ product. This high-end application allows the user to view colour on screen in precise colour, thereby facilitating an on-screen pass/fail decision of a remote measurement, together with the ability to assess the effect of colour in context through texture mapping. Such a process can virtually

eliminate the need for physical submissions and provides considerable added value over and above the purely numeric approach available through traditional QC packages.

7.8.4 Self approval by the supply base

Selected retailers who are already utilising the latest digital tools have taken their application to the next stage by allowing selected ‘accredited’ suppliers to self-approve their own lab-dip and production samples when they fall within documented tolerances – not so much ‘a leap of faith’ but more a realisation that, given the correct systems and procedures, unnecessary sampling can be avoided and the resultant savings and benefits are significant and easily achievable.

7.9 Electronic colour communication programmes – associated considerations and options

7.9.1 Supplier accreditation

An accreditation or supplier audit is widely regarded as a prerequisite and an insurance policy for those retailers who are managing and communicating colour electronically. The phrase ‘garbage in garbage out’ is very relevant here – colour communication packages work extremely well but they are rendered useless if the information being communicated is unreliable.

Standard accreditations/audits typically test and verify the instrument, making the measurement together with the operator’s ability to perform colour evaluation, in line with the retailer’s specific procedures. Additionally, the environment in which the system and operator are located are also audited for compliance. Once complete the retailer can be assured that remote measurements from that supplier can be trusted and assessed using electronic procedures.

7.9.2 Spectrophotometer monitoring and correlation

A more recent introduction to colour management programmes has been software to allow the frequent performance monitoring of spectrophotometers over and above that received during the annual service visit. It is widely acknowledged that spectrophotometers drift with time and this phenomenon increases as the instrument ages. There are software packages available that regularly check the performance of the instrument in order to prevent this from occurring and to ensure the integrity of measured and communicated data throughout electronic programmes.

Such software can also be utilised to correlate or profile spectrophotometers back to the original master instrument or to another selected master reference in order to supposedly offer improved inter-instrument agreement. However, the improvement available via the adoption of such an approach on textile samples is considered to be minimal and is often insufficient to justify the added complication of managing correlated and uncorrelated data in a retailer's supply chain. (*Such packages include Datacolor's Maestro Product and GMB's Netprofiler.*)

7.10 Electronic tracking and reporting packages

As the use of electronic colour programmes continues to increase, so does the amount of data that is produced by such systems. Operators are challenged with the ongoing maintenance, archiving, prioritisation and arrangement of this data into a format that allows them to concentrate on their respective departmental responsibilities. This is at the same time as having clear visibility of the colour process, together with an insight into vendor performance before, during and after the current season's submissions.

In direct response to this, software products exist (*including Datacolor's Track product, GMB's Netpalette and Ewarna's X-Match*) that concentrate specifically on the colour critical path, enabling the user to prioritise, track and report on individual colours and to filter colour selections based upon the respective commercial detail such as department, season, supplier, etc. Additionally, the user can obtain a 'snapshot' approach of any selected colour submission status without necessarily getting immersed in technical colour detail and thereafter run management reports to track vendor performance over selected periods.

7.11 Future trends and conclusion

With some exceptions, the general uptake and implementation of colour management technology in the US retail sector is some way ahead of the European sector, though there are encouraging signs that the major players in this market are finally waking up to the inevitable.

The reasons behind this are not easy to diagnose accurately, though it is suspected that the size and scope of the American retailers alone was sufficient to justify significant and specific focus and investment in this area at an earlier stage.

However, whilst most definitely on the increase, there is considerable scope for improvement *worldwide* in the implementation of electronic rather than physical programmes. There are really no justifiable technical barriers to implementation any longer – the technology is mature and proven and continues to evolve in line with market demand, the supply

chain has largely 'bought in' and endorsed this approach and the benefits could not be more evident.

It is foreseen that, in the future, systems are likely to become more automated, user friendly, design integrated and working in one universal language, but this should be viewed as a bonus not as a reason to wait or to procrastinate.

The barriers to implementation or initial adoption are mainly human considerations:

- maybe a lack of vision;
- maybe a lack of understanding of colour theory in retail;
- maybe a misunderstanding or misinterpretation of these pressing issues;
- maybe a reluctance to realign structures and attitudes in line with market forces;
- maybe an unrealistic approach to or expectation regarding capital investment.

The phrase 'the quick and the dead' is as relevant now as it ever has been – the pioneers are already there, hopefully it is not too late for the rest – maybe!