EXPERT TECHNICAL GUIDE

PRINTING FOR INTERIORS

GUIDE 1: INTRODUCTION

FESPA

profit for purpose

FESPA TECHNOLOGY GUIDE TO PRINTING FOR INTERIORS

Printing for interiors covers an enormous range of design and print concepts. A strong emphasis on creativity makes the field extremely difficult to quantify. It covers any interior design application, from offices and factories, through to hotels and households. Customers for printed interiors are anyone who wants to revamp their space often, at reasonable cost and on demand. Potential clients include individual consumers and businesses wanting new printed décor on a regular basis. Interior designers, design companies, architects, government and local authorities, are all candidates for printed interior services.

This guide explains the business considerations for printed interiors and presents some ideas for how printing companies can tackle the many new applications emerging. Printing can enhance any surface, so for interiors the array of possibilities is huge. From large surfaces such as walls, floors, ceilings, doors and windows, furnishings and upholstery, curtains and blinds, and worktops, to small ones such as remote controls, photographs and accessories, the applications are endless. Printed interiors includes any printed surface or decorated object used indoors. This includes glass surfaces printed with photovoltaic or insulating materials and acoustic panels for sound proofing. Digital printing creates new looks for obvious candidates such as walls and floors, to the less obvious options such as linens and throws, kitchenware and crockery, placemats and coasters, even clothes.

BEYOND BEAUTY

Enhancing surfaces through decoration has created business opportunities for centuries. Interior decor matters, whether it's for reasons of warmth and comfort or to convey status, power or personality. In the 21st century we have the added dimension of digital printing and communications technology, for on demand photorealistic image quality and fast, convenient production without the overheads of conventional print methods. According to Global Industry Analysts Inc, a market research company, at a CAGR of 26.1%, digital printing growth for printed interiors outstrips screen printing growth.

Advances in wide format digital printing technologies plus substrate innovations create new applications for the technology, especially for printed interiors. Communications advances, including the web, social media and mobile computing fuel creative ideas and demand for instant turnarounds.

There will never be an absolute transition from analogue to digital production models, and there will always be a market for handmade wallpapers, textiles, floorings and goods. But wide format digital printing systems reduce production costs and make processes available to a much wider audience. Turning this new market into a business is about spotting opportunities and creative business development.

Business models that capture significant shares of the printed interiors universe require clear ideas of target markets. They demand an understanding of how to combine technology that's up to the job, with optimised and flexible workflows, automated online ordering and profitable fulfillment processes. Where to start is the most important decision, especially the applications you want to tackle.

WALL ART

Wallpaper has been around for centuries and its production has gone through multiple reinventions, evolving in line with techniques for other print applications. Today most paper and vinyl wallpapers are produced using rotary screen, flexo or gravure printing. Wallpapers for specialist markets are often still printed using block and surface printing, however digital printing is steadily gaining market share in bespoke wallpaper production.

Expectations for wallpaper performance determine their means of production, so there are many approaches depending on budget, quality and durability expectations, especially light resistance. Wallpapers can for instance be hand painted or hand-printed using woodblocks or stencils, but compared to automated manufacturing options the cost of this approach is substantial. The final application, viewing environment and quality expectations are primary considerations in any printed interiors production business model, so if you are adding capacity for printing wall coverings, make sure you understand what your customers want and what they are prepared to pay for your services.

New types of wallpaper come onto the market all the time. Conductive inks for instance are being designed for use in touch screens that can be incorporated into wallpaper. Wallpaper can be printed with special coatings to block WiFi and mobile phone signals. It's even possible to create wallpapers that act as a computer interface with motion sensors and webcams. This may be too invasive for consumers, but could have considerable relevance in public interior spaces, such as train stations.

What might have broader appeal is wallpaper that adds lighting to a space using crystals and LEDs. Using a digital printer and adding LEDs by hand for this type of printed interiors is not cheap, however it adds a new design option that is relatively simple to exploit with wide format digital printers. Wallpaper is also used for window blinds, drawer linings and shelf coverings, so adding light to these applications extends the range of the concept.
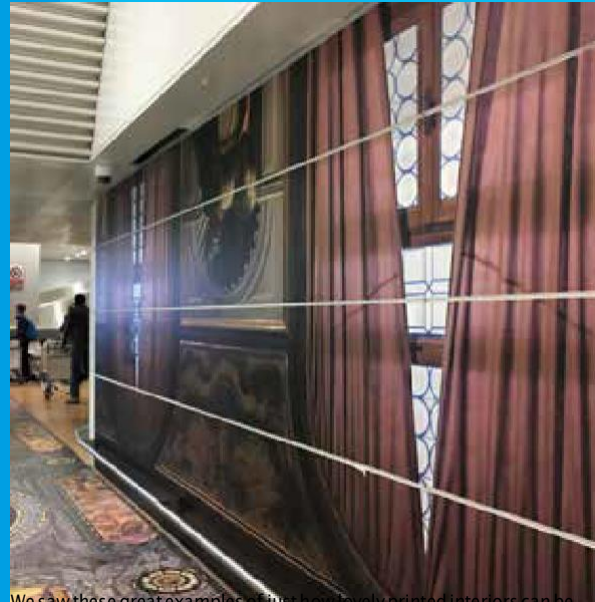
We saw these great examples of just how lovely printed interiors can be at Marco Polo Airport which serves Venice, Italy. The arrival area has been decorated with an ambitious series of murals.

ANOTHER BRICK IN THE WALL

Prospective customers for printed interiors may already be print buyers, but may not have considered applications beyond sign and display and commercial print applications. Printed wall coverings for locations and venues are part of the printed interiors universe, so companies who run events, and indoor fairs and conferences, can exploit modern wallpaper and related printing technologies. Sports clubs, homes factories and offices, shops, bars and restaurants, indeed any shared space that benefits from decoration can take advantage of print.

Capturing such opportunities requires an understanding of applications and practical considerations such as shrinkage and trimming short run digitally printed wallpaper rolls. Designs may include repeating patterns which must be matched so that the end result is a consistent design across the width of walls and where walls meet. Digitally printed designs must account for pattern repeats in the run length, as there will unavoidably be wasted offcuts, adding costs to the job.

The environment in which the coverings are to be used should also be considered, along with compliance with standards such as EN13501-1:2007, the fire classification allowing wallpapers to be used anywhere in a commercial building. Toxicity standards such as EN15102:2007, applying to all forms of wallcoverings must also be considered. Test methods such as the ANSI/BIFMA M7.1 are available for determining VOC emissions from furnishings, which must not exceed regulatory levels. The Martindale rub test measures a fabric's durability using abrasion to simulate wear and tear.

And then there are the usual considerations a printer must take into account: file delivery, preflight checking, proofing, colour management, ink performance, substrates, finishing   expectations

and so on. You will need to plan for larger file sizes and perhaps extend the range of data formats you accept. For the most part this will be PDFs but creative and design customers may want to provide you with TIFFs or native Illustrator files for repeating patterns. They may even want to send you EPS, so be prepared for preflight dramas, and especially check that there is a sufficient bleed in wallpaper designs to take into account irregulars in walls and trimming. You may want to consider charging for file preparation and proofing services.

Colour matching will be especially demanding if you are producing work for lots of different surfaces. Make sure you understand the viewing situations and the effect of different lighting environments on colour appearance. You should also ensure you have profiles for the required ink and substrate combinations.
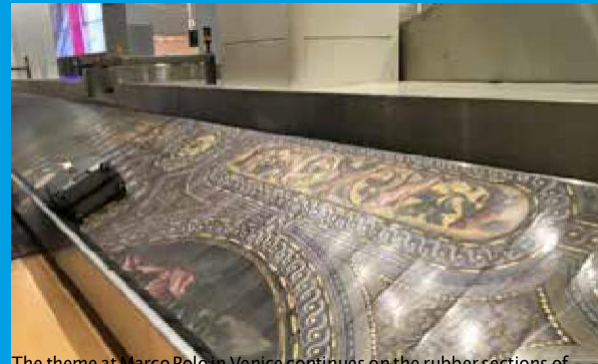
The theme at Marco Polo in Venice continues on the rubber sections of the baggage delivery belt, to provide a taste of Venice before you've even collected your luggage.

FLOORED

Production of printed flooring such as carpeting, linoleum, vinyl, laminates and rubber has followed a similar trajectory to that of wallpapers. Synthetic flooring is widely available as printed tiles, planks, sheets or rolls, and is generally selected for its durability, stain resistance, convenience and cost. Compared to wallpaper the performance criteria for floor coverings and mats are obviously more demanding. Surfaces must be durable, lightfast and able to resist staining and damage from sharp objects dropped onto them. Inks for printing floor coverings must be flexible and robust and work with different surfaces including fibres, acrylics and vinyls.

Every year at Fespa exhibitions there are more and more manufacturers showing examples of printed flooring using a variety of substrates, including carpets. This is a fast moving sector which cannot only replace conventional floor coverings but which creates a whole new market for bespoke floors. There are many options for creating a floor, however their functional requirements are stringent. Floors must be strong enough to be weight bearing, so they must comply with building regulations as well as VOC emissions, safety and fire standards. Floor coverings must be able to withstand the abrasion caused by high volume footfalls, and exposure to strong sunlight. They must be able to withstand cleaning without loss of coverage or colour.

Printing ceramic tiles for kitchen and bathroom applications is now virtually entirely a digital process. High humidity interiors can be decorated in other ways using digital technology, printing on glass and mirrors for instance. Prints used in these environments must be lightfast, and conform to recognised standards such as the Bluewool test used in Germany, and the ASTM D2247-02 standard for steam resistance.

Digital technologies have made it possible to produce any design on a flooring substrate. The technology you select should be able to produce work that meets customer expectations in terms of quality and lifetime. Your printing system should be flexible so that you can produce work with maximum uptime and minimal waste. Hybrid printers give you the option to print on flexible roll-to-roll media as well as rigid substrates. But if you are set on carpet printing for instance, select a machine capable of printing at least three metres wide and designed for the application.

Here is a selection of surfaces produced to demonstrate how digital printing technologies can transform conventional ideas for printed interiors.

DRESS UP

Carpet printing is just one small part of printing textiles to enhance interior spaces. Within the Fespa community and beyond, digital textile printing is of immediate interest to nearly 65% of wide format printers. 40% are already printing fabrics and another 20% are keen to get into this business, specifically to serve fashion and garment printing customers. Besides linens, upholstery, cushions and drapery, another option is uniforms and customised clothing, such as sportsware and related gym equipment. Standards apply here too and the most important is the globally recognised OEKO-TEX Standard 100, an independent certification and testing method for textile products.

Global Industry Analysts Inc, projects global printed textile production will reach 29.8 billion square metres by 2020. This is due to the rapid adoption of digital textile printing technologies, changing fashion trends and fast fashion, and rising purchasing power in developing countries. Digital technology makes possible direct to garment printing, mostly with inkjet dye sublimation printers using specialty inks.

Most digital textile printers, 40.9%, are installed in Europe, the Middle East and Africa (EMEA), and Asia Pacific (39.5%) which is also the largest and fastest growing market with a CAGR of 4.4%. According to Fibre2fashion a business-to-business marketplace for the fashion industry, digitally printed fabrics output will reach and exceed one billion square metres this year and 2.5 billion square metres by 2020, with a CAGR of 28% from 2015 to 2020. Digital printing could account for 5% of textile printing by 2020, up from 2% in 2016.

Trade shows are great opportunities to provide unified services for printed interiors. Floors, signage, textiles as well as marketing collateral are all part of the printed interiors world.

OBJECTIFY

But printed interiors are about more than wallpapers, floors and textiles. Fortunately digital printing supports the production of all of it. This includes objects such as electronics and furnishings, as well as conventional prints such as pictures and banners.

Many opportunities for providing print to enhance interior spaces are specific to different sectors. But consider the possibilities for supplying objects such as promotional gifts, trophies and plaques, wayfinding signs, and sports and leisure equipment such as surfboards and skis. There is also a place for more conventional forms of print in the printed interior universe, such as menus and table graphics, health and safety notices, signed original artworks, customised appliances, decals and stickers, adhesive logos. Anything that goes along with hospitality décor can be printed, as can backdrops, scenery and costumes for theatre productions or school prize days.

An infinity of opportunity for new print applications exists, so choosing the right technology is key. Fortunately there are plenty of options in the digital inkjet printing universe.

Bespoke interior designs are much more affordable if the materials are printed digitally. Convenient production processes make it easy to revamp spaces more frequently.

TECHNOLOGY OPTIONS

Dye sublimation or dye diffusion printing uses transfer paper, heat, time and pressure in the right combination to achieve the desired image quality. This chemical process vaporises dyes to transfer images via transfer paper into a substrate where they then bond at the molecular level with surface fibres. Dye-sub printed fabrics are steamed and washed for colour vibrancy and to ensure that they are colourfast. This technology produces a wide gamut of vibrant colours, but is relatively slow and expensive and can be wasteful. There has been a steady move towards inkjet dye sublimation technology in recent years. These machines are available as both desktop and industrial printers, and require no intermediate step, directly printing images mostly onto pretreated fabrics which are heated and pressed to fix the image. Technology is available that requires no pre- or post-treatment for standard fabrics such as polyester and cotton.

Digital dye sublimation is increasingly used for clothing and soft signage. The technique also works with 3D objects that have a suitable surface coating. It takes the sublimation process a step further, printing images directly onto treated polyester and polymer coated substrates. The substrates can then be heated to fix the colours. Direct imaging can yield higher quality and reduce consumables usage, however printheads are vulnerable to clogging due to the size of the particles in the dyes. Dye sublimation transfers require technologies based on advanced printheads capable of achieving consistent and reliable print density at low cost. Also the dye particles used in many dye sublimation printers for textile printing are designed to bond with polymers. This means that the fabrics being printed need to have a high polyester content or be precoated to achieve bright images. Make sure your ink choice works for preferred substrates and applications.

Consider also your productivity expectations. Digital printing for textiles, as well as other flexible and rigid surfaces is moving very quickly, with speeds of many hundreds of square metres per hour. If this is a new business direction, consider investing in a slower less expensive device before you risk all with a top of the line device.

Throughput capacity rises with the sophistication and cost of the printer. Your investment decision should consider speed, uptime, consumables costs (including printheads), substrate flexibility, service agreements, format and output resolution.

The number of inks the machine can print is another factor, for instance you may want to print an additional white ink to increase colour intensity or merely to create a white background. If the choice between flatbed and roll-to-roll technology is not obvious, a lower risk option might be to invest in a hybrid device that can print on flexible and rigid substrates. Keep in mind that you may need to invest in additions for pre- and post-treatments, such as calendaring, washing, cutting and sewing. And don't forget your own interior space and how you will accommodate the new kit in terms of its size and weight.

INKS

Many inks are available and the range constantly changes as developers come up with new formulations. In addition to dye-sublimation inks there are aqueous inks suitable for printing on canvas, board, card and paper. Solvent inks work for these as well as foamboard which can be used for interior panelling, Aluminium Composite Material (ACM), acrylic and polycarbonate, meshes, textiles and static films. The lighter, eco-solvents work for these applications as solvent inks with the exception of self-adhesive vinyls. Latex inks and UV cured inks are equally versatile but only UV works well with materials such as wood, glass and metals. Alternative to UV cured inks is to print self-adhesive vinyl with latex ink for instance and use it as a laminate.

Ink performance and colour consistency are also important and once again the application drives requirements. Adhesion to hard surfaces, particularly if exposed to cleaning fluids or moisture, matters as much as lightfastness and rub resistance. If the ink requires material surfaces to be coated or baked, consider the impact on workflow flexibility and production times, plus cost factors. Inks can be cured to different degrees to create textured matt and gloss effects; this too impacts productivity and cost. Applications requiring flexible materials, such as for laminating a curved surface require inks that stretch without cracking or lifting from the substrate.

If you are focusing on textile printing consider the inks required to print natural fabrics such as linen, silk, cotton, wool and blends, and synthetics such as lycra. How these materials will be used matters: you cannot use UV-cured inks for garments in case uncured ink comes into contact with skin, but they are fine for soft furnishings. Consider the ink's performance when printing textiles on both sides as well as only one.

More of the amazing work at Marco Polo Airport in Venice. This floor continues the view of them presented on the walls and selected panels of the luggage belts.

MATERIALS

Printer versatility, its printhead, substrate and ink options determine what you can print. If you want to sell refurbishment and remodelling services for printed interiors, consider which materials your printed interiors customers are likely to want to use. Alternatively consider printing to laminates that can be applied to surfaces, such as flooring, windows and furniture. Furniture and objects such as electrical appliances can be customised with total or partial wrapping with printed materials, if inks and substrates are up to the task.

Wallpapers for instance should have a smooth finish, be of sufficient weight and readily accept ink without wicking. Ideally they should be mould and mildew resistant, especially if they are for use in kitchens and bathrooms. Some wallpapers for digital printing are prepasted and have an approved fire certificate so they meet commercial wallcovering standards. Indoor permanence should be rated for at least two years, and preferably up to twenty years.

Self-adhesive fabric wallpapers that can be removed and repositioned, are suitable for temporary installations such as events and parties. Various fabrics can be printed for wall coverings, including synthetics and natural ones such as satin, suede and canvas.

The range of materials is clearly vast: flexible coated and uncoated substrates including backlit materials, meshes, banners, vinyls, metallised films, photographic and fine art papers, canvas, wallpapers, polypropylene, eco leather, fabrics and films. Films are available to provide one way viewing either into or out of a space, and window tinting and blackout films can be printed for privacy or to reduce sunlight glare. The range of rigid options suitable for interiors includes acrylic plastic and polycarbonate, plus ACM which can be printed direct or used with a preprinted self-adhesive vinyl. Besides composites, metal and plastics, rigid materials include ceramics and glass plus natural materials such as wood. Prior to investment test candidate ink and material combinations, ensuring that inks and substrates perform in the printing system as required.

This series of printed spaces includes object printing as well as surfaces and shows how light can affect colour appearance.

FINISHING

As with all forms of print, without finishing processes there is no end product. For printed interiors finishing ranges from the trimming of wallpapers, to the installation of floor coverings, and the cutting and sewing of textiles. Technology provides some answers, but practical considerations determine cost effectiveness.

Printed surfaces can be turned into tables and chairs for temporary applications, such as for exhibition stands. Depending on the strength of the substrate they even work for longer lasting applications.

DON'T FORGET ABOUT THE WORKFLOW

For years the graphics industry has focused on the performance of output devices. However in the internet age, workflow and data management are at least as important, especially for on demand customised work. Set up of printed interiors workflows to support production models that assume every output type is unique. This provides two big benefits the first of which is that having such a set up requires you to understand the capabilities of your workflow. The second benefit is that you will have a foundation from which to expand capacity and output type as your business grows, and can immediately respond to new output requests.

Business opportunities in this sector are as wide and tempting as the range of applications, but this is an exploding and therefore competitive market so use your imagination. Services for printed interiors can be limited to the print or could take the form of subcontracting for organisations such as event managers, marketing and advertising agencies, and even wedding planners and caterers. This extends to other entities such as local authorities and municipalities, flooring and interior design companies, sporting venues such as racecourses, tourist destinations and theme parks. You might even find local schools and universities asking you about marketing services for use in waiting rooms and elsewhere in their premises. There are even opportunities to provide print services for airport lounges, on escalators and in baggage halls.

NEXT STEPS

The world of printed interiors is clearly enormous, so setting up a new business to exploit the opportunities requires thought and solid business planning. Start with defining goals and considering your existing constraints and budget. Most devices for production of printed interiors are large, so consider where you will locate your new capacity. It might be more cost effective to set up dedicated print facilities dealing exclusively with the target clientele or as an added service to extend an existing sign and display or commercial printing business. If you want to take a more careful step into this sector, organise your factory so that the new business doesn't compromise existing production flows.

Most important is the technology investment choices you make which must be suitable for the part of the printed interiors puzzle you want to tackle. The golden rules apply: price, quality, speed. It's often said that you can only have two of these three, but digital printing technologies let you break that convention. This benefits your business and creates amazing opportunities for your customers.

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