

# **Influence of Cost against Area Coverage as Mediating Parameters in Choice of Paint Products**

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## **Abstract**

In choosing paint, several factors come into play some of which are economic or socio-cultural extraneous factors other than technical details. The choice of colour is mostly determined at the design stage while the quality and performance are dictated by the building type, economic forces and budget. The economic forces and limited options restrict the client's and the architect's ability to settle on the best option for the building type. While many of them see cost as a hindrance to getting better-quality paint, little is known of the ratio of the cost to area coverage. Using Primary and secondary qualitative inquiry strategy, this study seeks to unearth the underlying relationship between the cost of paint products and their corresponding area coverage to help the Architect and Client in making an informed decision with little or no consideration for cost implication. Kano city was used as a case study where paint manufacturers with paint depots in Kano are considered. Out of these companies, four produces and sell special paint products in addition to the conventional paint products while five companies produce conventional paints only. It was also found that some companies produce different varieties of particular paint product. Expectedly, different prices were found for each of the products. The analysis indicates that the price of a paint product does not suggest its economic advantage or otherwise. The costlier paint products were found to have wider area coverage compared to the cheaper products. Therefore, the cost of paint should be used technically when considered as a parameter in specifying paint and determining its budget.

**Keywords:** *Choice of paint, Cost, Area coverage, Influence*

## **Introduction**

Specifying materials for building construction forms a crucial stage of the procurement process. Quality, appearance, durability, maintenance cost etc, are determined by the decision taken during this stage (Ali, 2009; Ali, Kamaruzzaman, Sulaiman, & Peng, 2010; Yiu, 2008). The decision task is not an easy venture as it is found to be influenced by contrasting and circumstantial objectives (Clement, 2006; Malshe & Wagoo, 2004).

It is believed that some of the decisions are simply guided by past errors, experience, friend's influence, availability, economy, and project budget (Folorunsho, Yechian & Ert, 2011). Therefore, being a crucial stage of giving building its character and identity, painting has to be carefully carried out. Despite being a very common building material, paint technology is a complicated science that requires requisite expertise to specify.

There are many types of paint available today, while some are giving different surface texture and appearance, others are designed for particular applications (Roy et al., 1996). This makes the selection of paintless straightforward, however, consideration for the cost of paint in relation

to area coverage will only give a more satisfying end result if technically employed.

## **Specification in Construction Industry**

When a client decides to build, renovate, or reconstruct a facility, he engages others to prepare documents describing the work to be performed and the contractual requirements under which construction and related administrative activities are accomplished.

In a building procurement context, specification is seen as a 'statement of needs' describing what the customer intends to buy and consequently, what the successful supplier is expected to supply – (Jason, 2009). It has also been referred to as a description of the physical or functional characteristics (Kubba, 2010; Wienand & Joan, 2007). It, therefore, dictates the nature of supply, services, or construction items that describes the requirements to be satisfied by a product, material, or process – (Jason, 2009). It ultimately indicates, if appropriate, the procedures to determine whether the requirements are satisfied (Kalin et al., 2010).

In essence, specification is a statement of the

attributes of a product, process or service a user wishes to purchase, and consequently, which the supplier is expected to supply.

Specifications can be simple or complex depending on the need. The success of the procurement outcome often relies on the specification being a true and accurate statement of the buyer's requirements. Apart from being a means of identifying the goods/services required, specification forms part of any future contract that might result from offers received (Anderson & Adrenal, 2012). The process of Specification Writing, conducted in parallel with planning, design and drawing work, helps create the proper balance between client, statutory, technical and aesthetic requirements (Kalin et al., 2008, 2010).

The specification has always been an integral part of architectural practise that cannot be undermined. It is the responsibility of the architect to make and write an effective specification as part of the contract document to complement the drawings and make them effectively implemented in construction. There are two most common approaches in writing specification; performance-based specification and descriptive specification

(Adewale et al., 2018; Anigbogu & Anunike, 2004). Specifying by performance entails the illustration of the desired end-result of building materials and installation method.

The performance-based approach should permit greater innovation and competition but the benefits are farfetched because of the time and cost of producing essential performance definition, methods of verification and confirmation of performance values. It as well allows for maximum flexibility (window state) on the part of the contractor as it only focuses on the result and not on the method.

However, descriptive specification is used when the means to an end are set out and defined in detail outlines, exactly, how the contractor must perform his service or how the product is made (Adewale et al., 2018; Gelde, 2001; Kalin et al., 2010). In this type of specification, the detail is set out under three main headings: general, products and execution. The descriptive specification could refer to a code, standard or recognised document (reference specification), brand name or proprietary material which leaves no room for substitute. This is the most restrictive type of specification according to Gelde (2001).

### **Materials Choice and Specification**

Materials generally form one of the most important variables in the process of technical design. There are many parameters involved in the choice of materials, initially, availability and suitability are the primary variables, but the familiarity of the designers with these two issues is also paramount. This defines the 'comfort zone' for most designers and also represents the primary obstacle to innovation and a subsequent move to more sustainable design practices (Kubba, 2010).

Suitability and availability as well have a major impact on the process of selecting materials. The concept of suitability according to Kalin et al., (2010) depends on other materials involved, assembly processes, skills availability and budgets. This includes having to make decisions on whether a particular material is available as a refined component that may be factory finished within strict quality control standards or requires the enlightenment of design to the site staff to fully understand the performance variables of something new.

This process becomes far more complicated when a more holistic and sustainable design approach is chosen because the performance criterion itself becomes a variable. The

availability of a material according to Dodo et al, (2015) has however been a cause for concern during the selection process. It includes Physical availability (can it be acquired?), financial availability (is it affordable?) and environmental availability (is it a good and safe material to use?).

The method of choosing materials according to Roy et al. (1996), will generally reflect the approach taken to the design process. The safer the chosen route the more limited and therefore less potential for innovation. However, the riskier approach allows considerably more potential in the choice of materials. The safe approach does allow for a degree of innovation but would see choices limited to those with fully accredited and proved backgrounds.

The other end of the scale involves the selection of materials with little or no proved performance standards although other forms of data may be available. The risk increases dramatically but so does the potential for genuinely innovative design (Gelde, 2001). Unfortunately, the effect of failure or the fear of failure also represents a major obstacle.

The choice of materials comes from a

definition of the problem requiring a solution, knowledge of what has worked previously and what is available. Moving outside of the comfort zone' requires the acceptance of additional risk although this can be controlled by looking to prototype examples where some performance issues have been considered. The definition of performance requirements will therefore have a major part to play in the selection and eventual specification of material.

### **Paint Selection**

The terms 'paint' and 'surface coating' are often used interchangeably. Surface coating is the more general description of any material that may be applied as a thin continuous layer to a surface. Purists regard the term 'surface coating' is tautological. However, it has been used widely in the UK and in North America to distinguish painting from other forms of surface treatment, such as Electro-plating, anodizing, and the lamination of polymer film onto a surface (Roy et al., 1996). The paint was traditionally used to describe pigmented materials as distinct from clear films which are more properly called lacquers or varnishes.

The purpose of paints and surface coatings is two-fold. They may be required to provide

the solution to aesthetic or protective problems or both. For example, in painting the motor car the paint will be expected to enhance the appearance of the car body in terms of colour and gloss, and if the body is fabricated out of mild steel it will be required to give protection against corrosion. If the body is formed from glass fibre reinforced plastic the paint will only be required for aesthetic purposes (Roy et al., 1996).

There are very sound economic reasons why it is attractive to colour only the outer surface of articles that might otherwise be self-coloured by using materials of fabrication, e.g. plastics that are pigmented, particularly if a wide choice of coloured effects is required.

In considering the nature of paints it will become abundantly clear that the relationship between the coating and the substrate is extremely important (Aminu et al., 2015). The requirements for a paint that is to be applied to wood are different from those of paint to be applied to a metal substrate. Moreover, the method by which the paint is applied and cured (or dried) is likely to be very different.

In formulating a paint for a particular purpose it will be essential for the formulator to know the use to which the

painted article is to be put, and physical or mechanical requirements (Roy et al., 1996). Thus, paint for an item made from cast iron may call for good resistance to damage by impact (e.g. chipping), whilst a coating on a beer can will call for a high degree of flexibility.

Even though there is no limit to factors that guide the choice of paint (Roy et al., 1996; Malshe & Wagoo, 2004), however, it has been established that, apart from the cost of paint materials, four other important factors are to be kept in mind when selecting paint (Dodo et al., 2015);

The Richness of Colour is of significance when choosing paints because they are formulated with custom resins and tinted with proprietary colourants which ensure colours that remain vibrant for years to come. Some are specially formulated to hold richer, deeper colours better than others.

Similarly, Area Coverage of paint is very important and has been playing a front role in dictating the type of paint to be specified because it determines how economic a brand of paint can be. Furthermore, attention is usually given to washability for high traffic spots like porches, kitchens, hallways and trim. Some paints are formulated to stand up to repeated cleanups without compromising colour, richness or finish. The shinier the

finish, the easier to clean it will be. Lastly, consideration is also given to Smell Factor. These are Low and Zero Volatile Organic Compounds, or harmful chemicals responsible for paint fumes.

### **Research Methodology**

Two sets of data were collected for this study. The first was the primary data collected through structured interviews with paint depot managers within Kano city. This set of the interview was used to collect information on the various types of the products available within the depot, prices of each type and also additional information on how the prices fluctuate.

The second set of data was secondary, collected through either the company catalogue where available or the websites of the paint manufacturers whose catalogue is not readily available. The aim was to obtain information on the area coverage by each paint products and its types.

Since there are several paint products available in the markets in Kano, there is a need for sorting out to identify genuine paint products for the study, therefore those paint companies with a depot in Kano were considered. The data obtained were analysed using constant comparison content analysis (Leech, 2007).



## Results

Paint products according to the data obtained revealed that Nine paint manufacturers have paint depots in Kano. They are found to be of two categories. Those who produce special and high-quality paints and are referred to as in this study, Class A manufacturers and there those that produces conventional paints and are referred to as Class B manufacturers. Out of the Nine companies used for the study, four are found to fall under the class A category while the remaining five are the class B companies as shown in Table 1.

**Table 1:** Categories of Paint Companies

Class A	Class B
Berger Paints	Liberty paints
Dulux Paints	Skycoat Paints
Meyer Paints	Freedom Paints
Voda Paints	Prestige Paints
	President Paints

The result shows that prices and area coverage of paint products in Kano varies depending on the manufacturers and the type of the product.

## Cost in Relation to Commodity

The prices of paint products according to the results obtained are found not to be the same across different manufacturing companies (See Tables 1). For instance, the price of 20litres texcoat paint in Berger paint company that ranges from N11,452.00 to

N29,480.00 is not the same with Voda paint company that has the price range of N5,500 to N11,300.00 and that of the Dulux paint company sold at the range of N13,474.73 to N32,110.00.

Similarly, the same quantity of 20L of the Texcote product from Liberty paint company is sold at the range of N5,505.00 to N14,978.00 compared to Freedom, Sky coat and Prestige companies sold at the rate of N5500, N5200 and N16200.79 respectively. Therefore, the data analysed above shows that the price of 20litres texcoat ranges from N5200-N32110 across all the manufacturers in which Dulux company has the highest price and Sky Coat Company has the lowest.

In the same way, the price of a 20litres of emulsion paint in Berger Company ranges from N5,832.00 to N27,142.00 compared to the Voda paint company that is sold within the range of N4,800.00 to N14542.78. As for Dulux company of the same capacity if is sold within the price range of N17,277.00 to N35,175 while Meyer paint ranges from N7,226.00 to N14,095.00. As for Liberty Company, the price ranges from N3,700.00 to N9,549.00 and from N5,906.00 to N7,000.00 in President Company.

Meanwhile, Freedom, Sky coat and President Company sold it at the rate of N4,300.00, N4,000.00 and N11,570.00 respectively. Therefore, the above analysis shows that the price of a 20litres of emulsion paint ranged from N3700.00 to N35,175.00 across the manufacturing companies.

For gloss paint, the result shows that the price of 20litres ranges from N22,000.00 to N45,365.00 in Berger product but ranges from N6,789.00 to N9,780.00 in Voda Company paint product. Meanwhile, the price in Dulux company ranges from N14,588.00 to N34,529.00, while it ranges from N15,761.00 to N24,585.00 in Meyer company.

As for Prestige and President Company, the product is sold at the rate of N13,503.00 and N32,000 respectively. Therefore, from the above, it can be deduced that the price of 20litres of gloss paint ranges from N6,798.00 to N34,529.00 across all the

companies.

As for wall Satin product, 20litres is sold at the rate of N36,880.00 in Berger Company while is N24,347.00 in Voda company. Similarly, Dulux Company sells the product at the rate of N36,789.00 but Meyer Company sells it at the rate of N35,228.50. Meanwhile, Liberty, Freedom and Sky Coat Company sell it at the rate of 23070.70, 22000 and 18000 Naira respectively. From the above analysis, it can be deduced that the price of 20litres wall satin is range from 18000-36880 naira whereby Berger and sky coat companies have the highest and the lowest price respectively.

The above analysis shows that the Dulux company has the highest prices followed by the Berger, Meyer, President, Voda, Prestige, Liberty and Freedom Company while the Sky coat company has the lowest prices (Table 3 and 4).



**Table 2:** Cost of paint products in category A companies

BERGER Paints		VODA Paints		DULUX Paints		METER Paints	
<i>Product types</i>	<i>Price (N)/20L</i>	<i>Product types</i>	<i>Price (N)/20L</i>	<i>Product types</i>	<i>Price (N)/20L</i>	<i>Product types</i>	<i>Price (N)/20L</i>
Fire Retardant (F.R.T) texcoat	29,480	Vodatex premium roller tecture	11,300.22	Dulux trade Weathershield Textured	13474.73	Wall Satin (Specialized Premium)	35,228.50
Supatex texcoat	18,761	Vodatex premium tecture	10,140.55	Dulux Weathershield Textured	28487.96	Gladiator (Specialised Premium)	16,156.38
Robbialac texcoat	11,452	Vodatex smooth	9,200.12	Dulux Weathershield Ultra Textured	29195.04	Ultimate Emulsion (Premium)	7,226.82
Luxol emulsion	27,142	Voda tiger texcoat	5,500	Dulux sandtex Textured	17,992.13	Ultimate Gloss (Premium)	24,585.12
Superstar emulsion	15,918	Voda budget texcoat	6,500	Dulux Weathershield Tex-matt	32,110	Imperial Emulsion (Standard)	14,259.11
Robbialac emulsion	29,160	Voda graphic plastercoat	8,115.43	Dulux Sandtex Vinyl Emulsion	17,277.37	Imperial Gloss (Standard)	24,585.12
Luxol gloss	34,365	Voda premium emulsion	14,5433.78	Dulux matt Emulsion	23,419.36	Meyertex Plus (Premium)	25,946.77
Superstar gloss	33,990	Voda super premium emulsion	13,678.16	Dulux Silk Emulsion	26,964.88	Semi-Gloss Latex Emulsion	14,095
		Voda standard emulsion	11,244.90	Dulux Sandtex Intra Emulsion	35,175	Meyertex matt	27,574.32
		Voda satin	24,347.22	Dulux Caplux Emulsion	25,577.55	Meyertex satin	31,204.80
		Voda matt gloss	9,780.68	Dulux Gloss	34,529.10	Vinyl Silk	22,570.30
				Dulux Satin	36,789.56	Velvet Matt	6,900
				Dulux Sandtex Satin	22,088.62	Gloss Matt	15,761.73
				Dulux Eggshell	34,209.65	Egg Shell	17,230.02

Similarly, it was found that there is variation in prices from one product type to another within products of the same company. For instance, the prices within Berger Company as shown revealed that 20litres texcoat is sold at the range of N11,453.00 to N29,480.00 while that of the emulsion is range from N5,832.00 to N27,142.00, same

goes for a gloss that is sold at the rate of N4,400.00 to N9,073.00. this was found to be synonymous with the class A manufacturers as shown in Table 2. This can be attributed to either difference of quality within a particular product or variation in colour as empirically established.

**Table 3:** Cost of paint products in category B companies

<b>LIBERTY Paints</b>		<b>FREEDOM Paints</b>		<b>SKY COAT Paints</b>	
<i>Product types</i>	<i>Price (N)/20L</i>	<i>Product types</i>	<i>Price (N)/20L</i>	<i>Product types</i>	<i>Price (N)/20L</i>
Liberty Emulsion	3,700.33	Freedom emulsion	4,300	Emulsion	4,000
Liberty Texcoat	5,505.41	Freedom texcoat	5,500	Texcoat	5,200
Liberty Satin	23,070.70	Freedom satin	22,000	Satin	18,000
Liberty matt Emulsion	9,549.30				
Liberty matt Texcoat	14,978.57	<b>PRESIDENT Paints</b>		<b>PRESTIGE Paints</b>	
Liberty matt Satin	30,236.88	<i>Product types</i>	<i>Price (N)/20L</i>	<i>Product types</i>	<i>Price (N)/20L</i>
Liberty plus Emulsion	8,129.47	Emulsion - Off White	17,000	Prestige Superior emulsion	11,570.60
Liberty plus Texcoat	11,674.67	Emulsion - Coloured	16,000	Prestige acrylic texture finish	16,200.79
Liberty plus Satin	27,250.11	Gloss – White	32,000	Prestige high build gloss	13,503.40
				Prestige Undercoat	5,790.42
				Prestige Premium Quality (PQ) emulsion.	13,700.10

**Paint Area Coverage in relation to Manufacturers**

The extent to which paint covers per unit area according to data obtained as shown in

Table 3 suggest that paint coverage varies from one manufacturing company to another and also from one product type to another within each company.

**Table 4:** Paint Area coverage across companies

MANUFACTURERS	Class A					Class B		
	Meyer Paint	Dulux Paint	Berger Paint	Voda Paint	President	Reedom Paint	Prestige Paint	SkyCoat Paint
PRODUCT	Area coverage / 20Ltrs							
Weather Shield Textured	130	85	100	45	48	-	-	-
Standard Textured	100	65	120	45	40	48	60	40
Matt Emulsion	140	160	130	40	60	38	65	45
Silk Emulsion	140	160	150	95	-	65	75	85
Gloss	65	60	100	20	14	-	-	-
Satin	100	115	120	85	-	-	-	-

The result shows that the area coverage of various paint products depends on the product and the manufacturer. There are instances where a manufacturer has different models of a paint product. They as well have a special product which is made for a specific purpose.

For instance, Berger Paint company have three different types of textcote product and as well as three different types of emulsion paint. Under this circumstance, the area

coverage depends on a particular product, thus there is no blanket area coverage for the product. But for this study, area coverage of the most common and standard product is used.

The result represented in table 4 shows that products from the class A companies have higher area coverage when compared to the product from the class B companies. For instance, the area covered by weather textured paint in class A company ranges

between 85M<sup>2</sup> to 130M<sup>2</sup> as against 45M<sup>2</sup> to 48 M<sup>2</sup> covered by the class B companies. Similarly, the area covered by standard textured paint is found to range between 65M<sup>2</sup> to 120M<sup>2</sup> as against the 40M<sup>2</sup>-60M<sup>2</sup> covered by the same product from the class B companies.

### Conclusion

Understanding the variables dictating the choice of paint products goes a long way in helping a client and professional making specifications have an informed decision.

The findings from this study have shown that the price of a paint product does not suggest its economic advantage or otherwise.

Whenever a paint is to be chosen, there should be a comparative analysis between the cost of the available products in the market and their corresponding area coverage. This becomes necessary to achieve the desired optimal value for money, for instance, a paint product from a company may appear expensive, but may turn out to be of economic advantage when compared to the area coverage.

Similarly, a product from a company may appear relatively of lesser price but might turn out to be of a comparative economic

disadvantage if the area coverage is to be considered. It can then be said that where the economic advantage is desirable, the price of a paint product should be used technically if it is to be used as a yardstick in specifying paint and determining its budget.

### Reference

- Adewale, B. A., Oluwatayo, A. A., Uwakonye, O., & Ogunkoya, A. B. (2018). Shortfalls of Specification Writing in Nigerian Architectural Practice. *International Journal of Civil Engineering and Technology (IJCET)*, 9(7), 497506.
- Aminu, Y. D., Nafida, R., Elnfaty, S. A., Nyakuma, B., & Bashir Faiza. (2015). Attaining Points for Certification of Green Building through Choice of Paint. *The Italian Association of Chemical Engineering*, 45.
- Anderson, J. E., & Adrenal, C. Z. (2012). *Principles of Public Procurement+*. Tata McGraw-Hill Education.
- Anigbogu, N., & Anunike, N. (2004). Standard of Material Specification, their Implementation and Enforcement on Building Construction Projects in Nigeria. *ATBU Journal of Environmental Technology*, 3(1), 3344.
- Clement, F. O. (2006). Maintenance Reduction through the utilisation of climate compliant wall finishes. *Journal of Land Use and Development*, 2, 128132.
- Dodo Y. A., Nafida R., Zakari A., Elnafaty A.S., Nyakuma B.B., & Bashir F.M. (2015). Attaining points for certification of green building

- through choice of paint. *Chemical Engineering Transactions*, 45, 1 8 7 9 1 8 8 4 .  
<https://doi.org/10.3303/CET1545314>
- Gelde, J. (2001). *Specifying Architecture: A guide to professional practice*, Pty Ltd.
- Jason, C. D. (2009). *Specification writing goods and services procurement guide*. National Academies Press.
- Kalin, M., Weygant, R. S., Rosen, H. J., & Regener Jr, J. R. (2008). *Construction Specifications Writing: Principles and Procedures*. John Wiley & Sons, Inc.
- Kalin, M., Weygant, R. S., Rosen, H. J., & Regener Jr, J. R. (2010). *Construction Specification Writing: Principles and Procedures (Sixth)*. John Wiley & Sons, Inc., Hoboken.
- Kubba, S. (2010). *Understanding Specifications*. *Construction Specification*, 4(2), 413420.
- Leech, N. L. (2007). An array of qualitative data analysis tools: A call for Data analysis Triangulation. *School Psychology Quarterly*, 22(4), 577584.
- Malshe, V. C., & Wagoo, G. (2004). *Weathering Study of EpoxyPaints*. *Journal of Progress in Organic Coating*, 51, 267272.
- Roy, S. K., Thye, L. B., & Northwood, D. O. (1996). The evaluation of paint performance for exterior applications in Singapore's tropical environment. *Building and Environment*, 31(5), 477486.
- Wienand, N., & Joan, Z. (2007). *Materials, Specification and Detailing: Foundations of building design*. Taylor and Francis inc.