

The Spectrum of Pottery Production

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I. Introduction

When you pour your freshly brewed coffee into your Shamu mug that you just got at SeaWorld, you fail to consider anything about the mug. Who made it? Why did they make it? How was it made? Your Shamu mug and the cup that your friend made specifically for you on their pottery wheel both hold your morning coffee, but they are not the same. Path dependency in the ceramic production process determines the difference between art and commerce. The individual potter, studio potters, and mass production pottery factories all produce the same product functionally speaking, though their methodologies are systematically different. This case study compares three organizing systems in ceramic production and contrasts *what*, *why*, and *how* their design differs. In terms of *what*, all three systems aim to organize their materials to reduce waste, and their processes to increase efficiency. The resulting ceramic products range from unique artisanal creations to mass-produced identical goods. As for *why*, the creation of any physical ceramic product necessitates the organization of inputs and steps which transform a ball of clay into a finished work. Lastly in addressing *how*, the three systems organize their inputs, methodology, and outputs under the following criterion: motivation, customer connection, and breadth of production. Motivation refers to the purpose behind the creation of the product—whether it is for use in stores, museums, or simply as houseware. Customer connection refers to the relationship between the producer and the consumer—this considers distribution channels and the chain of command. Lastly, breadth of production refers to the time and necessary resources it takes to manufacture a ceramic product. These criteria dictate the underlying principles of organization in ceramic production.

Summary Table

	Individual	Studio	Factory
Motivation	Artistic	Monetary & honorific	Monetary
Customer Connection	Direct	Distant	Nonspecific
Breadth of Production	Low scale, high scarcity	Medium scale, medium scarcity	High scale, low scarcity

II. Glossary

The three pottery production models use a number of domain specific terms that are collected here:

Pug Mill - a machine which mixes together clay or other materials and extrudes them in a plastic state

Greenware - pottery which has been shaped but is still wet

Leather Hard - a condition of clay body which has been partially dried but has not had all moisture removed

Bone Dry - clay which has dried to the extent of its natural state—it has not undergone any firings

Bisqueware or Bisqued - clay which has been fired once at a low temperature—clay is hard but is still porous

Glazeware - a finished ceramic product that has a glassy coat of glaze on its exterior

Slip - suspended clay particles in water

Jigger - a mechanical arm which shapes pottery on the wheel

Kiln - thermally insulated chamber which produces temperatures high enough to remove moisture from clay and induce chemical changes

III. The Individual Potter - Personal Practice



Motivation: The individual potter only produces unique elements, their production process is not strictly standardized. Their objective is to create art rather than an iteration. The individual artist makes intentional decisions on material type, size, technique, decoration, etc. They do not have to operate within industry standards, they are bound only by their tools. Take, for example, Indigenous potters in New Mexico use pit *kilns* which involves stoking an open bonfire for days in a deep pit. Some artists may choose to use a manual kick wheel in favor of an electric one. These potters choose historical tools to honor the history of the practice. A potter's tool influences design, execution, and their artistic purpose. As the breadth of tools increases, the production time does as well, this inflates the price which then limits the markets in which a piece may be displayed or sold. It is not feasible for the individual potter to attempt mass production. Consumers tend to value the individual potter's

work more because it has an air of authenticity. The production process is unrepeatable—this scarcity increases the price and artistic merit.

Customer Connection: Individual potters work directly with the consumer—there is no chain of command and no distributors. The artist is free to manufacture whatever they desire within a framework of their choice. Under a commission-based system, the artist is free from economic constraints since the sale of their product is assured. The artist does not share any of the labor—they are responsible for design, production, and sales. They make up in labor intensity for what they lack in efficiency.

Breadth of Production: Individual potters require the most amount of time as their production process has not been pared down in any way to increase efficiency for economic gain. Consumers often choose to work directly with an individual potter because of the intense care and craftsmanship which goes into their work. The individual potter begins by constituting their clay. This is typically done with a *pug mill*, which is a machine that mixes clay with a large blade and then vacuums out any air. Clay can be mixed with a number of different materials to achieve a desired effect. After the clay has been constituted, the individual potter forms a ball then centers the clay on the pottery wheel. They use the centrifugal force of the wheel to manipulate the clay upwards and outwards to form bowls, plates, vases, etc. The clay must dry to the *leather hard* stage, where it is not fully dry but still soft to the touch, so that excess clay can be removed. This can take upwards of 12 hours. The individual potter returns the piece to the wheel to remove excess clay and create a foot at the base of their work. They must then let the clay dry completely until it reaches the *bone dry* stage—this can take a day or more. Once the clay is completely dry, it may be *bisque*. This typically takes around 12 hours to warm up to 1000°F and another 12 hours to cool down. At this point, a glaze composed of silica, alumina, and colorants is applied and then fired once more to fuse the glaze to the clay body. This last firing is significantly hotter—the kiln must reach over 2000°F which will take another day to heat and cool. Finally, after a week of work, the individual potter has created a cup.



IV. The Studio Potters - Heath Ceramics



Motivation: Heath Ceramics utilizes unique clay and glaze formulas. Edith Heath, a former Berkeley ceramics professor, started Heath Ceramics with her husband in 1948 and has designed every collection still sold by Heath. She passed away in 2005, but the studio carries on her work using specially designed levers and molds which recreate her original designs. Heath does not do specialty or commission work. They celebrate the process of creation by formulating new glazes every year, but choose to honor Edith's work by never changing her designs or clay formula. Their production celebrates her innovations while appealing to the modern consumer. The motivation of their manufacturing and sales process is guided by history and attention to craftsmanship.

Customer Connection: Heath is an employee owned business and they do not work with distributors. They sell ceramics at their five stores located around California as well as on their website. Heath employs a number of specialists from administration to production. Within each sector, employees are organized hierarchically. Sector leaders often have worked with the company since its inception. The artisans are categorized by the product type they work with—tile, cups, or dinnerware. There are separate specialists for slip, recycling, firing, and glazing. They employ dozens in their warehouses and stores. A cup may pass through a number of hands before it reaches the consumer, though each plays an essential role in its creation. The ceramic production process at Heath relies heavily on its employees and the care of the human hand.

Breadth of Production: Heath fundamentally values preservation of craft. To keep up with their demand and honor Edith's legacy, they mix human design elements with ceramic technology to reduce production time and costs. Heath uses a proprietary clay formula designed by Edith in the early 1940s. Edith was inspired by the native clays of California and wanted her work to honor the land she worked on. The production process at Heath begins with the formulation of this clay. Like the individual potter, they reuse excess clay scraps by processing it with a clay mill. Heath uses an industrial cookie

cutter press to cut out tiles which then are left to dry until they are ready to be bisqued. For their bowls and cups, they use a *jigger and jolly system*. A premeasured piece of clay is placed on a spinning mold. A specially designed arm lever (*jigger*) is then lowered onto the clay to press the clay into the exact form. They then let the pieces dry to boneware. This is done in a moisture-controlled room to reduce cracking and thus product loss. Heath hand dips or sprays every product with a pre-measured amount of glaze to ensure an even coating. Unlike the individual potter who fires their piece twice, this piece is fired only once. Heath uses a low-fire clay and specialized glazing formulas which allow them to finish the product with only one firing. Heath products go directly from *greenware* to *glazeware*, they skip over the bisque stage. Their kiln fires to 2080°F for eight hours. They use industrial kilns which closely monitor gas usage to fire thousands of pieces at once. This reduces time, energy use, and environmental impact. The piece is then packaged and shipped to Heath stores.



Mixing Clay

Heath uses a proprietary clay formula developed by Edith Heath in 1947. They mix together dry clay scraps with water.

Cookie Cutter

Flat pieces of clay are pressed into their desired thickness and then cut into tile shapes. Excess clay is returned to step 1.

Jigger and Jolly

Block of clay is placed into spinning mold. Custom tool with hand lever then lowers and shapes clay to exact piece.

Hand Glazing

Pieces are either dipped by hand or sprayed. They predetermine the amount and formula of glaze to reduce dripping.

Single Firing

Heath uses low-fire stoneware which requires only one firing. Low-temperature kilns reduce costs and environmental impact.

V. Mass Production Pottery - Casafina Pottery



Motivation: Mass production pottery intends to make the greatest profit by reducing production costs and time. They sell to a number of suppliers across the world and must have a tightly controlled system in place to meet demands. Mass production of pottery limits the scope of production in favor of scale. Casafina Pottery only produces tableware, but their batches are typically done in iterations of 2500 pieces. They emphasize quantity over quality.

Customer Connection: Mass production pottery relies heavily on automated processes. The majority of the work is completed by machines to limit potential human error and increase efficiency—it requires little to no human supervision. The original design is typically drafted by a potter and then altered to accommodate fabrication restrictions. These machines make thousands of identical iterations which all share the same resource description. Mass production potters are not concerned with distribution of ceramics. Once a piece leaves the factory, it is the responsibility of the distributor to help it reach human hands. The path of production can cross continents and strongly isolates the producer from the consumer.

Breadth of Production: Mass pottery production typically use *slip* over clay. Slip is a liquefied suspension of clay particles in water. Manufacturers can mix elements into their slip to increase the strength or alter the color of their end product. In order to get thousands of perfectly identical products, factories will utilize pressurized slip casting. This involves pouring a premeasured amount of slip into a porous resin mold which removes excess moisture and leaves a layer of solid clay. They pressurize the interior of the mold to force the particles to bond more tightly together—this creates a smoother and stronger product. This process takes only a few minutes, as compared to the individual potter who may take days to throw, trim, and dry a piece. After the pieces are removed from their casts, they follow an assembly line to a machine which sprays a premeasured amount of glaze onto the clay. They are then loaded directly into an industrial size kiln which fires them once to completion. Most mass production avoids firing twice since it saves time and energy thereby reducing cost. The time and temperature of the firing vary depending on the product. For example, ceramic toilets are fired to a

higher temperature to make them more durable. Tableware, on the other hand, is fired at a lower temperature since they do not require longevity. Finally, the pieces are packaged and shipped to distributors to be sold to the consumer. Casafina is able to make far more products than the individual potter or studio potter because their production line is so short.



VI. Conclusion

Different industries serve different demands—the organization of the production process meets the needs of the producer and the consumer. The pottery production spectrum epitomizes the importance of path dependence and the Shamu problem. The production path of the individual, studio, and factory potter are decidedly distinct though the end products are functionally equivalent. The production path is what determines value—it separates iterations from unique resource elements that are regarded as art.