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Johannes Gutenberg, The Printing Press Inventor Who Revolutionized Communication

By MARY O'NEILL, FOR INVESTOR'S BUSINESS DAILY

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The Gutenberg Bible, a 1,282-page production that came off his press from 1452 to 1455, was a hot seller in Europe. [View Enlarged Image](#)

His invention is a principal force behind nearly every development — scientific, religious, political and cultural — of the last 500 years.

It has altered nearly every category of human experience, from language and national identity to global economies; from clothing and furniture to the cure of disease; from educational systems to solar systems.

Francis Bacon, a Scientific Revolution pioneer, declared it one of three inventions since antiquity — along with the compass and gunpowder — to "have changed the appearance and state of the whole world."

Only the printing press is credited to one person: Johannes Gutenberg.

As with the compass and gunpowder, the Chinese were the first to experiment with movable type, the key to printing. Their 11th-century efforts were stymied by some 40,000 symbols.

Gutenberg had dozens of characters, not thousands, plus the advantage of wine presses, paper mills and metalworking experience.

"His innovation was the merging of existing technologies into a new combination," said Mark Dimunation, chief of the Rare Book & Special Collections Division at the Library of Congress in Washington.

Gutenberg captured an idea: A few disparate ingredients could be catalyzed for a new purpose.

Then as now, the trick was executing the plan. If his oblique comment about a "secret" in

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1439 referred to the printing press, Gutenberg took 11 years to create his first product.

He faced the same hurdles as every entrepreneur — staffing, financing, prototyping — but Gutenberg cleared them in the midst of civil strife and political exile.

On The Run

Gutenberg was born in Mainz, Germany, circa 1400, to an upper-class family. The privileged status did little for his security. Social unrest against the patricians forced him to flee his hometown three times before he was 30, and the city siphoned his annuity.

He grew up a few steps from the archiepiscopal mint, where punch makers engraved insignias, letters and images into steel coins.

Whether inspired by this early exposure or driven by economic practicalities, Gutenberg learned the trade of metalworking.

Metal was the springboard he needed. Before the printing press, documents were duplicated by copyists at a rate of two pages a week, or mechanically with wood blocks. After weeks of carving, a wooden block would be inked, covered with paper and stamped to "print" a mirror image of one page.

Gutenberg's maneuver was to focus on letters, not pages.

Taking a cue from the coin makers he likely watched as a child, he punched each character in metal. In Latin, the language of the literate, that meant 290 characters, counting letters, numbers, punctuation marks, abbreviations and ligatures.



Gutenberg was born circa 1400 in Mainz, Germany, and used his metalworking training to invent his machine. [View Enlarged Image](#)

He devised a method of quickly replicating each original character in metal so he could have reusable, uniform, elegant, mobile pieces of type at his fingertips.

Movable type was the missing ingredient for efficient printing, and it changed the entire recipe.

Gutenberg had to re-texture the paper. He had to cook his own ink. He had to sort, cut, fold and insert pages — an unknown complication for a scribe. The press itself was massive — lines of type arranged in a metal form that weighed as much as a grown man — and had to descend with perfectly consistent pressure.

Beyond these technical issues, he had to select his content carefully.

By 1450, he had moved back to Mainz and was indebted to his investor, who had collateralized his equipment. Gutenberg needed a product that would sell.

He had honed his craft by printing a Latin primer, a calendar and other small jobs, and now the path was clear for his masterstroke.

The Gutenberg Bible, printed from 1452 to 1455, was an ambitious undertaking. At 1,282 pages, it required up to six compositors working simultaneously.

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Not satisfied with a mechanical reproduction of text, he aimed to match the scribes in aesthetic value.

"It is an extremely successful piece of bookmaking," said Paul Needham, the Scheide librarian at Princeton University. "The printing is exceptionally regular and so black it shines. Even a scribal document would not be as black and shiny."

Following the scribal tradition, Gutenberg arranged two text columns surrounded by wide margins for illumination — hand-decorated borders, initials and illustrations. Those custom touches make each Gutenberg Bible, though printed from a press, unique.

Amid rumors the Bible was sold out pre-release, even a cardinal clambered for a copy. In the time Gutenberg took to print 180 copies, 48 of which still exist, a scribe could complete one.

"It was a completely different way of selling books, to have all ready to sell at one time," Needham told IBD. "It was widely distributed. There was a sophisticated trade route, so it was a book for anywhere in Europe that you could sell it."

Refugees from Mainz soon traveled those trade routes. Gutenberg's shop fueled the first propaganda war between two rivals for the city's archbishopric, and the hostility erupted into full-scale bloodshed in 1462. Gutenberg was again exiled from his hometown, along with many of his workers.



This 19th-century press in Munich's German Museum is a descendant of Gutenberg's mid-1400s original. [View Enlarged Image](#)

They took their know-how to other regions, and print shops sprouted in cities across Europe.

Those shops printed maps, calendars, encyclopedias, dictionaries and language guides, as well as mathematical, musical, literary and scientific material. Page numbers, indexes, annotations and title pages were added to organize readers' thinking.

In the *Journal of Modern History*, historian Elizabeth Eisenstein explains, "Given drifting texts, migrating manuscripts, localized chronologies and multiform maps, there could be no systematic forward movement, no accumulation of stepping stones enabling a new generation to begin where the prior one had left off." With the printing press, "scholars could build on the work of their predecessors instead of trying to retrieve scattered fragments of it."

Records and measurements suddenly became repeatable in their original form, not subject to loss or corruption. Clothes could be cut to a standard pattern, cities could be planned and discoveries shared.

"Think of Galileo in 1610," Dimunation told IBD. "After seeing the moon through a telescope, he printed six or eight images of it and the Milky Way. Only five years later, that data was filed in Beijing. Previously, it would have taken multiple generations for that knowledge to travel, and the passed-on images would have been far removed from Galileo's accuracy. Gutenberg's invention condenses time and allows knowledge to flow up and down trade routes."

Change surged. Martin Luther's 95 Theses shot across Germany in two weeks in 1517, and across Europe in two months. His sermons and tracts were known as "flying writings."

As much as his ideas, the spread of his ideology, through printing, changed Western religion.

Luther and other thinkers printed in everyday language, not elite Latin. Printing rooted clumps of villagers to one shared lexicon and, because customs were also printed in that shared language, to national behavior and attitudes.

A New Day

With increased literacy — reading replaced mimesis as an educational method, and the gazette replaced oral news — a chorus of new voices rang out. Advertisers, activists, writers, schoolmasters, journalists, celebrities — these are professions born from the printing press.

Three years before his death in 1468, Gutenberg received an honorary title and pension for the printing press. Now his invention is recognized as the bedrock of nearly every modern activity.

Without it, we would not have freedom of expression, off-the-rack clothes, discrete grades in school, knowledge of other countries and planets, redress of grievances, fame, codified language, national identities or scientific advance.

Nor much to read.

Gutenberg's Keys

What: Invented the printing press, letting information be preserved, organized, refined and spread across the globe.

How: Business savvy, technical mastery, artistic ideals; he harnessed every skill to execute his vision, even through political exile and financial hardship.

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