Laurence D. Fink, the chief of BlackRock, has become convinced that the company must bet big on the power of machines., be it Aladdin, the firm’s risk management platform; robo-advisers; big data; or even artificial intelligence. Damon Winter/The New York Times

Score one for the machines.

The largest fund company in the world, BlackRock, has faced a thorny challenge since it acquired the exchange-traded-fund business from Barclays in 2009.

These low cost, computer-driven funds have exploded in growth, leaving in
the dust the stock pickers who had spurred an earlier expansion for the firm. The rise of passive investing — exchange-traded funds, index funds and the like — has revolutionized the investment world, providing Main Street investors with greater opportunities at lower fees while putting pressure on even Wall Street’s biggest money managers.

Now, after years of deliberations, Laurence D. Fink, a founder and chief executive of BlackRock, has cast his lot with the machines.

On Tuesday, BlackRock laid out an ambitious plan to consolidate a large number of actively managed mutual funds with peers that rely more on algorithms and models to pick stocks.

The initiative is the most explicit action by a major fund management firm in reaction to the exodus of investors from actively managed stock funds to cheaper funds that track every variety of index and investment theme.

Some $30 billion in assets (about 11 percent of active equity funds) will be targeted, with $6 billion rebranded BlackRock Advantage funds. These funds focus on quantitative and other strategies that adopt a more rules-based approach to investing.

“The democratization of information has made it much harder for active management,” Mr. Fink said in an interview. “We have to change the ecosystem — that means relying more on big data, artificial intelligence, factors and models within quant and traditional investment strategies.”

As part of the restructuring, seven of BlackRock’s 53 stock pickers are expected to step down from their funds. Several of the money managers will stay on as advisers. At least 36 employees connected to the funds are leaving the firm.

While BlackRock is proceeding gradually, in many ways the new plan is a direct attack on the cult of the brainy mutual fund manager, popularized in
the 1980s and 1990s by Peter Lynch, a stock-picking wizard at the fund giant Fidelity.

Today, asset managers like Pimco, Franklin Templeton, Aberdeen and, of course, Fidelity continue to make the case that their bond and equity managers can outsmart the broader market — and charge a premium price for doing so.

Since 2009, however, as the performance of these funds has suffered, millions of investors have rejected this proposition, abandoning their expensive mutual funds for better-performing funds that track various indexes at a fraction of the cost.

Now the biggest fund companies are Vanguard, the indexing pioneer, and BlackRock, which together oversee close to $10 trillion in assets.

BlackRock, with its fleet of iShares E.T.F.s, has certainly benefited from the investor revolution — one that threatens to disrupt the mutual fund industry in the years ahead.

Still, the monster in the mutual fund room by far has been Vanguard, which, via index funds and exchange-traded funds, has had historic inflows.

Last year, for example, $423 billion left actively managed stock funds and $390 billion poured into index funds, according to Morningstar. Of that amount, Vanguard captured $277 billion, nearly tripling the amount that went to its nearest rival, BlackRock.

Mr. Fink has always professed to be agnostic as to whether a client bought a no-frills exchange-traded fund tracking low volatility stocks or an expensive mutual fund investing in small United States companies.

Let the client choose has long been his mantra.
Left unsaid has been the reality that at his root Mr. Fink is now a true believer in systematic investing styles that favor algorithms, science and data-reliant models over the stock picking smarts of individual portfolio managers.

In recent years he has hired Andrew Ang, a star finance professor from Columbia, to push BlackRock into factor-based investing, a theme-based approach to allocating assets.

And since last year, BlackRock’s dyed-in-the-wool stock pickers have worked in the same division as its quants. These managers, many of whom have Ph.D.s, might buy (or sell) Walmart’s stock on the basis of a satellite feed that reveals how many cars are in its parking lots as opposed to an insight gleaned from the innards of the retailer’s balance sheet.

In sum, Mr. Fink has become convinced that BlackRock must bet big on the power of machines, be it Aladdin, the firm’s risk management platform, robo-advisers, big data or even artificial intelligence.

Just about any interview or conference call with Mr. Fink bears this out: Invariably, the conversation comes around to technology, with scant mention of what the firm’s stock pickers are doing.

But simply going all-in on machine-driven passive investing over active has not been an option for Mr. Fink. While the assets of the firm’s actively managed stock funds have shrunk to $201 billion today from $208 billion in 2009, the business is still very profitable for BlackRock, representing 16 percent of total revenue.

According to data from Morningstar, only 11 percent of BlackRock’s actively managed equity funds have beaten their benchmarks since 2009. Since 2012, $27.5 billion has left BlackRock actively managed mutual funds, per Morningstar data.
The new push, which is being overseen by Mark Wiseman, a top executive at Canada’s top pension fund whom Mr. Fink hired last year to revamp his equity business, highlights strategies in which a portfolio manager makes big bets on a select group of stocks.

Still, there is no mistaking the larger message: Expensive, actively managed funds looking to make a mark picking United States stocks must adapt to the new realities at BlackRock.

Take BlackRock’s Large Cap Core fund, which invests in big American companies. Since 2009, the fund’s assets have halved, to $1.5 billion, trailing the index by 1.3 percent over the last three years.

The fund’s lead manager will be replaced by three portfolio experts from BlackRock’s quantitative investing team, where all varieties of computer models are crunched in pursuit of stock picking ideas. Fees will also be halved.

Of course, none of these moves are likely to immediately halt the outflows of the past years. In fact outflows are likely to increase, as few investors want to stick with a fund undergoing an existential makeover.

But as Mr. Fink and his new equity deputy see it, it is better to take the pain now than later.

“The old way of people sitting in a room picking stocks, thinking they are smarter than the next guy — that does not work anymore,” Mr. Wiseman said. “These are stormy seas for active managers, but we at BlackRock are an aircraft carrier, and we are going to chart our way through these seas.”