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# DIGITAL TRANSFORMATIONS MAY SOLVE REAL-WORLD PROBLEMS

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We are all familiar with the realignment of expectations that has befallen the [share prices of many companies focused on Software as a Service \(SaaS\) during 2022](#). While it is important to gather and analyze all possible statistics, we think it's also essential to think about the problems in the real world that the services of these companies may help solve. If the solutions have value, we believe this is the core reason why, when the next cycle of strong performance for [growth](#) companies occurs, there is potential for a rebound.

## U.S. Holiday Travel in 2022: Southwest Airlines Has Particular Trouble

The last couple of weeks of December typically bring people lots of excitement, as there are many gatherings of families and friends around different holidays. As travel plans were expected to peak in 2022 across the U.S., there was a sudden burst of severe weather, yielding significant snow and ice in many states and many subsequent flight delays and cancellations. While annoying, massive snowstorms across the midwestern and northeastern United States are not outside the realm of normal expectations in the month of December.

However, it was noticeable that even after weather conditions had eased, Southwest Airlines was still canceling many flights—approximately 70% of its schedule on December 26, 2022—while other airlines were coming out on the other side of the foul weather event.<sup>1</sup>

Was there anything unique happening at Southwest Airlines? The problems did, in fact, draw the attention of the U.S. Transportation Department. Transportation Secretary Pete Buttigieg said, “[On December 28, 2022] Southwest canceled 59% of its flights, while other major airlines canceled 3%... Inadequate computer systems made it difficult to shift crews to where they were needed most.” Those statistics alone tell us that something more than the weather event must hold the explanation.<sup>2</sup>

As we were writing this blog post, and as the situation continued to evolve, it was published that the cost to Southwest Airlines of this particular issue could be in the range of \$725–\$825 million. Southwest canceled roughly as many flights in the last 10 days of 2022 as it did in the 10 months prior. It's also notable that the airline's [net income](#) for the first nine months of 2022 was \$759 million.<sup>3</sup>

Mathematically, this period of 10 days cost Southwest the picture of its 2022 operating results, in that, instead of anything positive, this is what will be remembered for this year.

## Introducing SkySolver: The Dilemma of Patching vs. Revamping Software Systems

If you fly frequently, you might develop a mental checklist that tells you the true state of your upcoming flight. Seeing an actual plane at the gate? Tick the box. Seeing pilots and flight attendants board the plane? Tick the box. When boxes remain unchecked, your gut starts to feel the annoyance that comes with a delay...or worse.

Southwest relies on crew-assignment software called SkySolver.<sup>4</sup> Like any software, there is an expected, reasonable lifespan over which the software could be expected to, with

appropriate modifications, provide solutions to the problem for which it was designed. Given that the world tends toward greater complexity, so too must software tend toward greater and greater capability.

As you cannot straddle the chassis of a vehicle with unlimited modifications over time, you also cannot straddle the foundation of a software program with an unlimited string of updates. Eventually, it makes more sense to build something new.

During the December 2022 storm, SkySolver could not handle the task of matching crew members to the flights that they should work. The software was not designed to solve problems on that scale, and Southwest's operations could be more complex than those of other carriers because Southwest does not use the same "[hub-and-spoke](#)" flight network that is more the industry standard.<sup>5</sup>

The solution in late December 2022? Southwest reverted to manual scheduling!!!!<sup>6</sup>

If any company faced with a software issue is forced to go back to manual operations, it should be clear that more problems will be coming. One cost that people pay close attention to is money, but the other is time, and the primary benefit of software-based solutions is the saving of time.

#### **Airline Operations: Slow to Adopt New Technologies and Lots of Historical Silos**

Frequently, airlines will work with software vendors in singular aspects of their operation. There might be one group responsible for the things customers see—like the application available for smartphones. There might be another group responsible for aircraft maintenance. There might be another group responsible for crew scheduling. If everything is working normally, there are no problems. Once there is a disruption, problems can compound because each of the systems may be siloed, unable to communicate in real time with other systems and requiring manual interventions.<sup>7</sup>

#### **Cloud Computing Has Offered Solutions in High-Pressure, High-Consequence Situations**

If we are looking for proof that [cloud computing](#) is up to the standard of providing feasible, working infrastructure for high-consequence problems, there are myriad cases. Two examples include:

- In February 2021, Google Cloud announced the "Intelligent Vaccine Impact solution," which was meant to help communities push the COVID-19 vaccine to more people, more efficiently. It was also the case that Google Cloud was helping with information, scheduling and data analytics.<sup>8</sup>
- "Russian missiles can't destroy the cloud." State registers and databases are critical information infrastructure. While many of the large cloud providers have worked to help Ukraine, Amazon Web Services, in particular, was helpful in uploading and then securing essential data quickly in the earlier stages of Russia's invasion.<sup>9</sup>

#### **Airlines Are Adopting Cloud Solutions (Each at Their Own Pace)**

We were curious to see if other major U.S. airlines had made any announcements of partnerships with the big cloud providers, since cloud computing is not brand-new, and we have seen announcements of partnerships in other industries, like financial exchanges.

- In July 2022, Delta announced a multi-year deal with Amazon Web Services that aims to revamp the end-to-end travel experience for its passengers.<sup>10</sup>

- In December 2021, United Airlines announced Amazon Web Services as its preferred cloud provider. United will tap into machine learning, databases, analytics, computing, storage and security capabilities from the cloud provider. It was also noted that United installed Amazon SageMaker to forecast irregularities in operations and gain insights for improving customer service, baggage routing and flight scheduling.<sup>11</sup>
- In May 2022, American Airlines announced Microsoft Azure as its preferred cloud provider for airline applications. American is already working with Azure's artificial intelligence, machine learning and data analytics for gating decisions at the 136 gates operated at its Dallas Fort Worth hub. The concept involves augmenting manual decisions made by gate planners with Azure's ability to look at multiple data points simultaneously for the hundreds of daily American Airlines arrivals.<sup>12</sup>

While each airline may be on its own respective journey, it's clear that the industry could be said to be familiar with cloud computing and the possible benefits to be had from working with some of the large providers. The system that could be built today would look significantly different than that which would have been built 20 years ago.

#### **Bottom Line: The world's Digital Transformation Is a Marathon**

I admit that sometimes I find myself thinking—what problem exists that I cannot solve on my phone, computer or some combination of the two? This must mean that the world has been digitally transformed, telling us that the future runway may be shorter. However, when we see the announcements—and the different airlines mentioned in this blog post are a mere microcosm of the broader world—they are not years and years back in the past, and they are not signaling completed projects. They are initiations, and they are confined to specific functional areas rather than entire operations. Many of the deals we see for such partnerships are measured in years, predictions of further capabilities to be added at different points in the future. Even if the COVID-19 pandemic pulled forward certain types of software-oriented solutions, a large array of further opportunities remains.

In our opinion, the cloud computing megatrend is closer to the start than the end if we are thinking of the global economy as a whole. The [WisdomTree Cloud Computing Fund \(WCLD\)](#) represents a way to seek to capture this long-term trend of digital transformation.

*Click [here](#) for a full list of WCLD's fund holdings. Holdings are subject to change and risk.*

<sup>1</sup> Source: Leslie Josephs, "Southwest warns of more flight cancellations as meltdown draws federal scrutiny," CNBC.com, 12/26/22.

<sup>2</sup> Source: Neil Raden, "What just happened to Southwest Airlines? A cautionary tale about underfunding key IT technology," Diginomica, 1/3/23.

<sup>3</sup> Source: Niraj Chokshi and Peter Eavis, "Southwest's Meltdown Could Cost It Up to \$825 Million," The New York Times, 1/6/23.

<sup>4</sup> Source: Belle Lin, "Southwest Meltdown Shows Airlines Need Tighter Software Integration," Wall Street Journal, 1/2/23.

<sup>5</sup> Source: Lin, 1/2/23.

<sup>6</sup> Source: Lin, 1/2/23.<sup>7</sup> Source: Lin, 1/2/23.

<sup>8</sup> Source: <https://cloud.google.com/blog/topics/inside-google-cloud/how-google-cloud-is-supporting-covid-19-vaccination-efforts>. The Intelligent Vaccine Impact solution helps increase vaccine availability and equitable access to those who need it, and assists governments in building awareness, confidence, and acceptance of vaccines

<sup>9</sup> Source: [https://www.theregister.com/2022/11/30/ukraine\\_cloud\\_migration/](https://www.theregister.com/2022/11/30/ukraine_cloud_migration/)

<sup>10</sup> Source: Caroline Donnelly, "Delta Airlines signs multi-year cloud deal with AWS as

customer experience revamp gather pace,” ComputerWeekly.com, 7/13/22.

<sup>11</sup> Source: <https://www.airport-technology.com/news/amazon-web-services-cloud-provider-untel-airlines/>

<sup>12</sup> Source: <https://www.aviationtoday.com/2022/05/19/american-airlines-microsoft-azure/>

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## DEFINITIONS

**Growth**...: Characterized by higher price levels relative to fundamentals, such as dividends or earnings. Price levels are higher because investors are willing to pay more due to their expectations of future improvements in these fundamentals.

**Net income**...: A company's total earnings (or profit), which are calculated by taking revenues and adjusting for the cost of doing business, depreciation, interest, taxes and other expenses.

**Hub-and-spoke**...: Hub and spoke is a term used to describe any process that resembles the wheel of a bicycle, where paths (spokes) shoot out from a central location (the hub). In the logistics industry, a hub and spoke distribution model is used to disperse inventory to multiple fulfillment centers from a large distribution center.