



# DIGITAL TRANSFORMATION WHITE PAPER



**Moldex3D**

Leading Digital Transformation, or Follow it

[Image Credit: <https://www.stanleyengineeredfastening.com>]

## Introduction

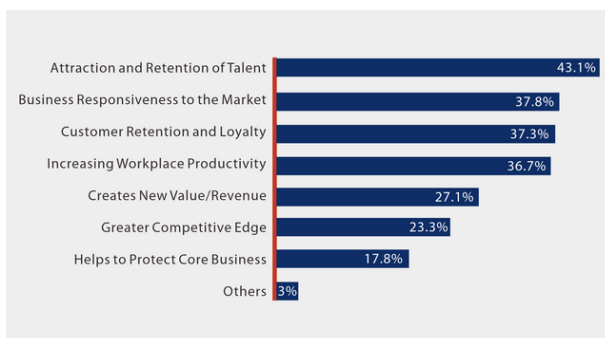
Manufacturers today are faced with fiercer internal and external challenges than ever. Not only are customers seeking smarter and diverse solutions that can be promptly delivered; the rise of Industry 4.0, at the same time, is propelling business-wide computerization and automation, forcing companies to adapt to cloud computing, big data analytics, Industrial Internet of Things (IIoT), etc. with the aim of making everything in the supply chain intelligent – from manufacturing to warehousing and logistics.

If companies want to innovate amidst these intertwined forces, they must kick-start digital transformation in their organization, embracing digital tools that were previously regarded as nice-to-have, but now are essential. The first step of digital transformation is digitization, moving the information from hard-copy to soft-copy, and from analog to digital.



According to a survey<sup>1</sup> by Fujitsu, a multinational information and communications technology equipment and services corporation, most companies are aware of the benefits brought by digital transformation which include attracting and retaining talent, increasing responsiveness to the market, and improving customer retention and loyalty.

### What Do You Think Are The Main Benefits to Digitalization Within Your Organization?



<sup>1</sup> "Walking the digital tightrope, a Fujitsu report", January 2016

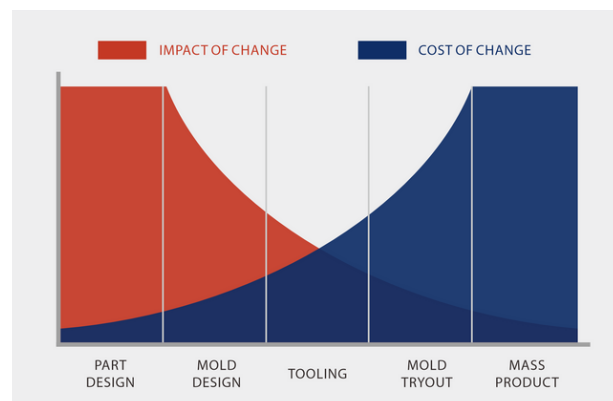
Although many manufacturers are eager to transform their businesses, they might struggle to find the right toolset that's most user-friendly and cost-effective. Cloud-based, data-centered, and mobile-friendliness will be the essentials when selecting suitable solutions.

## Transforming Business Using Smart Tools

Beginning with product design, companies are recommended to adopt Design for Manufacturing (DFM) which is the process of designing parts or products for easy mass-production. To do so, organizations should implement molding simulation software and accurately interpret analysis results. Before starting the simulation, they should acquire proper material data, which is the key to getting appropriate analysis. Moldex3D [Material Hub Cloud](#) (part of [Moldiverse\\*](#)) is an online material property database for thermoplastic materials. It also provides services such as Alternative Material, Material Comparison, and Material Data Fitting. Users can easily find and compare materials or get substitute material data to complete desired simulation.

Once having the most updated material data, part designers who use Moldex3D SYNC, the CAD-embedded software, can quickly simulate the flow, packing, cooling, and warpage in NX, Creo, and SOLIDWORKS to see if there might be short shot, weld line and/or warpage, among other molding defects happening in the part, and can directly modify the product designs based on the analysis results. The seamless integration of Moldex3D SYNC in the CAD packages, facilitates DFM without the need for part designers to switch between the CAD and CAE software.

*Moldiverse is Moldex3D's cloud portal for its public cloud-based solutions.*

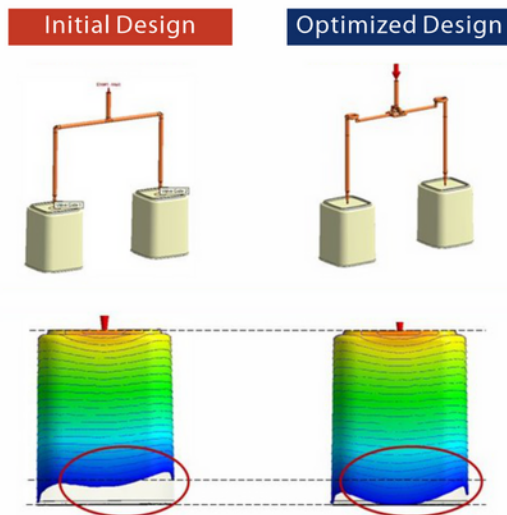


**Figure 1:** Early DFM allows design changes to happen quickly at the least costly stage.

For CAE engineers, Moldex3D simulation software helps construct 3D solid models while giving speedy analysis of injection molding, compression molding, composite molding, IC packaging among other processes. Reducing cycle time, minimizing molding defects, and increasing production yield rate can all be achieved by leveraging Moldex3D insights.

## Success Story →

A household goods company encountered unbalanced flow, air traps, weld lines, and halo marks in their storage tanks made of AS (styrene acrylonitrile resin, or SAN). Using Moldex3D Flow simulation, they were able to identify flow imbalances and captured accurate and high-resolution temperature distribution in the part, ultimately **improving the yield rate by 99%**.



To bring simulation results even closer to reality, Moldex3D offers “Machine Mode” where CAE engineers can choose one of the injection molding machines from the software’s database of over 10,000 machine models and modify the data, such as screw stroke, plastication rate, and screw speed, to give exact inputs to the software and bridge the gap between simulation and shop floor.

With customized CAE analysis at hand, molders can then transfer it to the specific injection molding machine that will be used to mold the part and perform mold trials with optimized process parameters.

Moreover, as each machine runs differently, either because of machine type (i.e. electric, hydraulic, or hybrid) or manufacture year, molders can record the dynamic responses and specific characteristics before transferring the data back to simulation software, achieving physical-digital integration.

For instance, users of Sumitomo injection molding machines can exchange files of the process settings and CAE results between the machine and software; and for users of FANUC machines, they can view the real-time simulation results in 3D models directly in the machine’s control panel via Moldex3D’s data management platform, iSLM. Other recourses on iSLM, including optimized process parameters, DFM reports, and mold tryout records, are also available through the control panel, allowing process engineers to set the machine parameters based on the results shown to get optimized part quality.

## Moldex3D Tip →

### Cloud-native Solutions

Built entirely in cloud, cloud-native services break on-premises hardware barriers by offering easy-to-access-and-share applications that can be used and managed regardless of location or device. Examples are Google Workspace and Moldex3D iSLM, the data management and storage platform launched recently.

Breaking the hardware barrier, Moldex3D also offers **cloud-based machine characterization** in iMolding Hub (part of Moldiverse) which is a comprehensive “molding cloud” that is dedicated to optimizing on-site tryout results by incorporating scientific molding and machine responses. iMolding Hub diagnoses machine responses of users’ in-house injection molding machines and generates a report along with a machine characteristics file as a **digital twin**.

Users can import the file in to the Moldex3D software to incorporate machine data into CAE analysis. As companies build up their own machine characteristics library in the iMolding Hub, it would become easy to manage, search and compare information digitally, **regardless of location or device**.

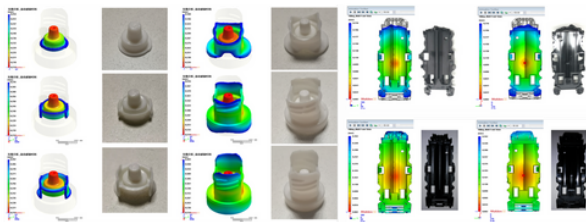
## Success Story



Suzhou Chengmo Precision Technology partnered with Moldex3D to launch a “T0 project” targeting successful **mass production without any mold tryout** (“T0” stands for “Trial 0”). The project concerned multiple aspects in the manufacturing process, including part/mold design, material/machine evaluation, process conditions, and system integration.



Feeding the actual material data and machine characteristics to Moldex3D, Chengmo obtained the optimum processing parameters that were directly used in the on-site machines, reaching a **90% match** with the final process settings and **95% match** in the short shot experiment, successfully achieving the target of “T0” mass production.



95% Match in Short Shot Experiment

With the growing number of simulation projects, sometimes on-premises computing capacity may not be able to handle the amount of work within organizations. Having **on-demand cloud computation** is a good way to scale up in-house simulation capabilities without heavy investments.

If companies bring subscription of AWS, Azure, or Google Cloud Platform, they can deploy the Moldex3D software in their private cloud space using **Moldex3D Cloud-Connect**. This solution breaks the on-premises hardware barrier for high performance computing (HPC) and features high data security and fast data transfer.



## Secure and Centralized Data Management & Storage

As the whole manufacturing process generates different types of information, such as part geometry, material properties, molding process settings, mold tryout process reports, etc., it is essential to **collect and organize data** in a systematic and easy-to-access way. iSLM is the smart data storage and management platform built specifically for the plastic molding industry. Starting with uploading and accumulating simulation projects, users establish a company-wide **knowledge bank** that can be securely accessed anytime, anywhere within the organization. Later, when a new project comes in, part designers can refer to historical projects for key information such as product geometry, gate design, material used, or molding machine settings for the new design. The CAE designers can also build a mold trial process report based on the simulation results for on-site molders’ reference.

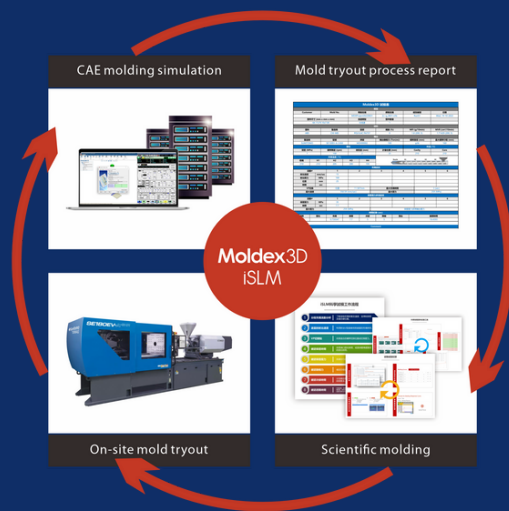
Molders can record the actual machine settings, such as plastication rate and ejector pin position, on the same report before starting a mold tryout. Once the trial finishes, CAE engineers can compare the formed part with simulation results and modify any parameter if necessary. This scientific approach greatly cuts time and money required for the trial process and can be applied to any process even when there’s lack of rather experienced staff. With the accumulated data, organizations gradually establish a centralized, digital knowledge pool that **breaks organizational silos** and maximizes the value of reusable knowledge assets.



## Moldex3D Tip →

### Scientific Mold Trial

Scientific mold trial is different from its traditional counterpart in that it heavily depends on CAE-validated results to suggest the optimum injection speed, V/P switchover point, clamping force, cooling time, etc. The **repeatable process window** guarantees a certain degree of success rate even without experienced molders available on the shop floor.



ITo shorten the learning curve, Moldex3D University (part of Moldiverse), which contains Moldex3D Software Training, Open Course and Plastics E-learning (MPE), offers online self-teaching resource for junior and senior staff members alike

Moldex3D Software Training consists of fundamental and advanced guides to the software, as well as the application of advanced modules. Open Course, on the other hand, gives full access to the past Moldex3D Live Webinars, while MPE provides comprehensive knowledge centering around polymer processing. Learn the theory and applications of product design, mold design, hot runner, and virtual molding machine operation 24 x 7, only in MPE.



Smart learning, design, and manufacturing are only interlinked when companies adopt digitalization tools and start to scale digital intelligence. C-suite now make better and more-informed and swift decisions, thanks to the application of data-centered tools and the establishment of corporate knowledge base. This process initiates with digitization, connecting across the silos, leveraging a wide range of solutions, and finally, delivering at a digital speed. If organizations wish to **lead digital transformation** instead of following it, Moldex3D’s arsenal of solutions are the first step companies should take, right now.

## Comprehensive Learning Resources

In addition to keeping organizational intelligence, with ageing workforce and shortage of experienced manpower affecting plastic molding industry, it has become more essential than ever to train and retain staff. Cultivating new employees is usually time-consuming, especially when there is on-site, hands-on machine operation training involved.

### About CoreTech System (Moldex3D)

CoreTech System Co., Ltd. (Moldex3D) has been providing the professional CAE analysis solution “Moldex” series for the plastic injection molding industry since 1995, and the current product “Moldex3D” is marketed worldwide. Committed to providing advanced technologies and solutions to meet industrial demands, CoreTech System has extended its sales and service network to provide local, immediate, and professional service. CoreTech System presents innovative technology, which helps customers troubleshoot from product design to development, optimize design patterns, shorten time-to-market, and maximize product return on investment (ROI). More information can be found at Moldex3D Website.