

IT UTILIZATION - MASS CUSTOMIZATION MATRIX

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ABSTRACT

During the past decade, the role of information technology has tremendously changed within organization. Recently, IT has been adopted to accommodate a high degree of customer involvement in designing process, specifying customized product offerings, enhancing manufacturing flexibility, and controlling manufacturing operations. The confluence of these advances allows producers to customize their products/services at low cost and also provides customers with the benefits of customized products with relatively low prices. While the research on the mass customization has been reported in the OM literature, empirical studies that explain the relationship between information technology (IT) utilization and mass customization (MC) are not available. This study introduces IT utilization – mass customization matrix explaining the phenomenon by which IT enhances the level of mass customization through the supply chain integration between the firm and its trading partners.

INTRODUCTION

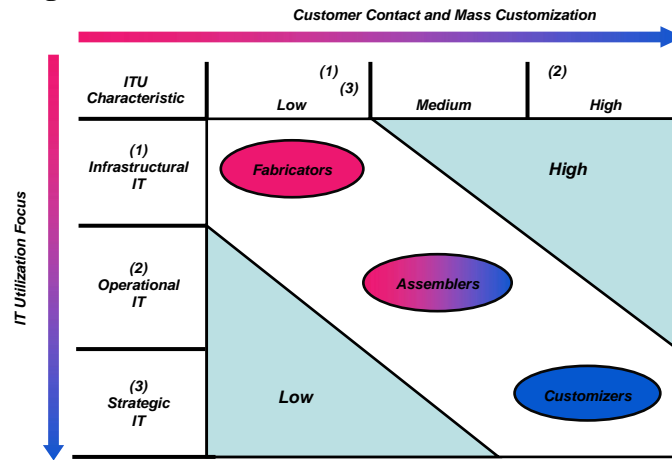
The notion of “Mass Customization” was first proposed by Philip Kotler [31] from a marketing management perspective. Pine [46][47] defined mass customization as the low-cost, high quality, large volume delivery of individually customized goods and services. Mass customization is the ability of a firm to quickly produce customized products on a large scale at a cost comparable to non-customized products [8][31][35][46][47]. IT has dramatically changed the ways organizations perform their operations and become a strategic imperative for many organizations [50]. Recently, IT has been adopted to accommodate a high degree of customer involvement in product design process in specifying customized product offerings. IT is used to enhance manufacturing processes and control manufacturing operations. The confluence of these advances allows producers to customize products at low cost and allows customers to reap the benefits of customized products with relatively low prices deem impossible in the conventional paradigm [13]. While the research on the mass customization has been reported in the OM literature, empirical studies that investigate the relationships among information technology utilization (IT Utilization), supply chain integration - which includes customer integration (CI) and supplier integration (SI), and mass customization (MC) are not available and represent an important missing link in manufacturing research. This study proposes IT utilization – mass customization matrix to explain the phenomenon by which supply chain integration between the firm and its trading partners mediate the relationship between IT utilization and the level of mass customization.

IT UTILIZATION - MASS CUSTOMIZATION MATRIX

Figure 1 shows IT utilization – mass customization matrix. The columns of the matrix represent the level of mass customization and the level of customer contact, going from the least customization and lowest degree of customer contact on the left-hand side to the highest customization and customer contact on the right-hand side. The rows represent the level of IT utilization focus, going from the infrastructural IT on the top to the strategic IT on the bottom. The firm may position its process to one of

the three mass customization choices: (1) *Fabricators*, (2) *Assemblers*, and (3) *Customizers*. Because the level of IT utilization is crucial and a pre-requisite of the success of mass customization, it is unlikely that a process is operating in the lower-left corner area. Firms operating in the lower-left corner are considered a low performer. Firms operating in the top-right corner of the matrix are called a high performer because firms use limited technology capabilities to interact with their customers and yet accomplish the high level of customization. Operating in the diagonal area exhibits a benchmark and is recommended.

Figure 1: IT Utilization - Mass Customization Matrix



THEORETICAL FRAMEWORK

From IT utilization – mass customization matrix, the foundation of mass customization is the ability to achieve customer responsiveness and the types of information technology implemented within the firm. Based on the relationship among IT utilization, supply chain integration, and mass customization, the theoretical framework can be drawn. Figure 2 suggests that mass customization (MC) is affected by the firm’s ability to implement information technology (IT) and the degree of involvement between the firm and its trading partners (customers and suppliers).

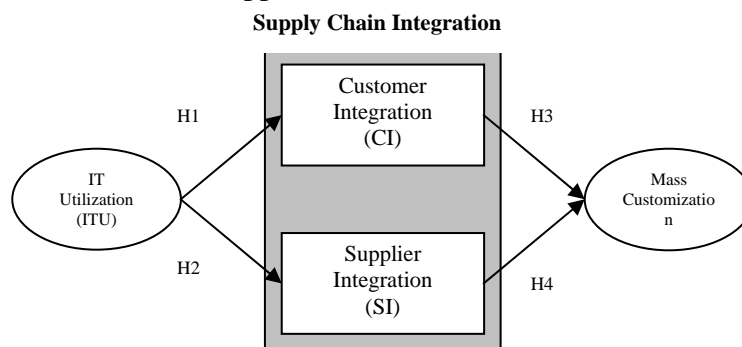


Figure 2: Impact of IT utilization on supply chain integration and mass customization

Research Hypotheses

The following hypotheses were drawn from extensive literature review and logical arguments.

- H1: The higher the extent of IT utilization, the higher the extent of customer integration*
- H2: The higher the extent of IT utilization, the higher the extent of supplier integration*
- H3: The higher the extent of customer integration, the higher the extent of mass customization*
- H4: The higher the extent of supplier integration, the higher the extent of mass customization*

RESEARCH METHODOLOGY

Item generation

Twenty six items (26) were developed for ITU, six items (6) were developed for CI, six items (6) were developed for SI, and nine items (9) were developed for MC.

Sample Characteristics

Table 1 shows sample characteristics by job titles, job functions, level of education, and years of work.

Job Functions (261)		Job Titles (220)	
Corporate Executive	6.51% (17)	CEO/President	6.82% (15)
Purchasing	6.13% (16)	Director	7.27% (16)
Transportation	2.30% (6)	Manager	53.18% (117)
Manufacturing Production	41.38% (108)	Supervisor	27.27% (60)
Distribution	1.15% (3)	Engineer	4.55% (10)
Sales	6.13% (16)	Other	0.91% (2)
Unidentified	13.41% (35)		
Other	22.99% (60)		

Large Scale Instrument Assessment Methodology

Table 2 displays the structural model results. Out of the 4 hypothesized relationships, 3 were found to be significantly supported. Hypotheses 1, 2, and 3 indicate the relationships are significant at the 0.001 level.

Table 3: Structural Modeling Results

Hypotheses	Relationship	Coefficients	t-value	P	Support
H1	ITU → CI	0.49	4.52	***	Yes
H2	ITU → SI	0.38	4.68	***	Yes
H3	CI → MC	0.49	4.06	***	Yes
H4	SI → MC	0.00	0.04	0.97	No
GFI = 0.92 AGFI = 0.90 RMSEA = 0.05					

DISCUSSION AND IMPLICATION

Previous section reports three of four hypotheses were significantly supported. The hypotheses include (1) the direct relationship between IT utilization and customer integration, (2) the direct relationship between IT utilization and supplier integration, and (3) the direct relationship between customer integration and mass customization. One hypothesis was not significantly supported, which is the direct relationship between supplier integration and mass customization. The results imply the indirect impact of IT utilization on mass customization through customer integration, but not supplier integration. The high level of IT utilization in the organization may affect the level of customer and supplier integration because the firm uses IT to interact with its customers and suppliers. However, only IT implementation that improves the customer total value will drive mass customization level. To successfully implement mass customization, a firm must emphasize the integration of all internal activities with its potential customers including infrastructural components (e.g., hardware, software, and standard), operational components (e.g., managing daily operations activities and exchanging information), and strategic components (e.g., justifying business plan, analyzing market position, and setting long term business goals). This process is crucial and a pre-requisite for the success of a mass customization strategy.

References are available upon request