ANALYZING DISRUPTIVE INNOVATION IN U.S. LIBERAL ARTS HIGHER EDUCATION INSTITUTIONS

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Independent liberal arts colleges (LACs) are slowly disappearing from the landscape of U.S. higher education. Depletion of endowments, mission creep, and a stigma in institutional innovation are prominent factors that threaten this institutional legacy of higher education. On the other hand, LAC graduates are constantly sought after by employers as strong job candidates, suggesting that the LACs in the United States need an innovative approach to self-transformation. Propelled by technological advancement and based on the marketing principles of non-competition, job-to-be-done, and unbundling, Clayton Christensen's Disruptive Innovation Theory (DI) has been adopted in the social sector for a few years. There is no evidence suggesting that the LACs are immune to the impact of DI and its examples (e.g., MOOC) that have already entered the higher education sector. The Disruptive Innovation Theory can be enriched by lending a transformational vision to a higher education sub-sector, but there is a glaring shortage of empirical research that aims at developing the two concepts through their marriage. This dissertation research employed a mixed method of online survey and semi-structured interview with senior administrators from 225 private "Baccalaureate Colleges - Arts

& Sciences Focus" based on 2015 Carnegie Classification of Institutions of Higher Education. The senior administrators are equivalents of chief academic officer, chief information officer, and chief financial officer from each institution. Conceptual awareness and existing models of disruptive innovation were analyzed and presented in this study.

Keywords: Liberal arts college; Disruptive innovation; Institutional innovation; Governance in higher education; Educational technology

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1.0 INTRODUCTION

In 2009, I made a decision after receiving my master's degree in English Language and Literature in China that I would go to the United States to pursue my doctorate. At that time, I had no idea as to what I would like to study or a clear projection about my future career. The sole reason for me to fly over was that this country as a world leader in higher education had so intrigued me that I felt like risking a few years of my life to see it with my own eyes. I naturally selected the subject of higher education… management.

I had a little trouble making applications because initially I thought the higher education institutions (HEIs) in this country were lined up by a homogeneous ranking system where one HEI was supposed to be better than the other if it appeared first to the eyes in that single system. I was wrong. I felt ridiculed to find myself surrounded by a host of ranking categories such as "Top Public Schools", "Best Value Schools", "A+ Schools for B Students", "Best Historically Black Colleges and Universities", and "Best Liberal Arts Colleges", to name a few (U.S. News & World Report 2016). This was the first time that I realized the core strengths of American higher education come not from homogeneity, but diversity which represents an unrelenting call for recognizing and fostering different values that together contribute to the excellence of human learning. In 2010 and 2011, Williams College, a private liberal arts college housing a student population of mere two thousand, was refereed by *Forbes* magazine as the best American undergraduate institution ahead of every Ivy League university. A loyalty to the teaching of "the

simple joy of learning" and a claim of her most *practical* offerings being "openness, creativity, flexibility, and power of education in the liberal arts" (Williams College 2016) rendered the triumph of Williams College not only a surprise but also a revelation. It brought light to me that, within the discourse of American higher education, the revered doctoral-level education, symbolized by monolithic research universities, was not the sole path toward human excellence. There are, on the other hand, liberal arts colleges that cherish a bit of something else. Upon this realization, I was ignited to the inquiry about this unique HEI species that was completely alien to me eight years ago.

1.1 AN OLD FRIEND: THE LIBERAL ARTS

It is important to make it clear from the very beginning that my study focus is upon the independent liberal arts colleges in the United States, rather than liberal arts education in general. However, I shall inevitably delve into some of the useful information about liberal arts education in order to guide my inquiry as to the effectiveness of these institutions in providing liberal arts education. The term *liberal arts*, or *artes liberales* in Latin, originated during the Late Antiquity where seven canonical subjects emerged in two groups, i.e. *trivium*, the humanities that consist of grammar, logic, and rhetoric, and *quadrivium*, the scientific arts of arithmetic, geometry, astronomy, and music. Mastery of the seven subjects were believed to bestow freedom of mind, a noble and lofty educational pursuit that was carried over later to the United States in a peculiar institutional form.

In the contemporary discourse of American higher education where liberal arts is still largely relevant, the independent liberal arts colleges bear a better witness to how this

educational ideal is still being preserved and advocated. However, being disproportionally smaller in number than other HEIs often rattling with their own contentious issues, these colleges are underrepresented in their efforts of advocating a higher education that is more than skills training and job preparation. It is highly revealing to examine how colleges like Williams, Swarthmore, and Amherst have maintained their prominence in American higher education vis-à-vis the likes of Ivy Leagues and state universities.

The independent liberal arts colleges in the United States are also underrepresented in terms of institutional struggles and difficulties. Empirical research to address these issues is strikingly rare. Among few, David Breneman (1990) and Louis Menand (2001) reported sharp decrease respectively in independent liberal arts colleges and liberal arts enrollments in the past several decades, due to depreciation of liberal arts education and a vocational orientation of American higher education. Consequently, misinformed and negative opinions emerged toward liberal arts and independent liberal arts colleges, which caused further statistical drops, and thus the vicious cycle.

Perhaps the biggest challenge for a college in trouble is a drastic transformational approach that may or may not work. The latest 2015 version of Carnegie Classification of Institutions of Higher Education suggested a 6.3 percent shrink of the “Baccalaureate Colleges – Arts and Science Focus” classification which constituted only 5.4 percent of all the higher education institutions in the United States. Of those “disappearing” colleges, two announced closure in the past five years, with many others adding vocational-oriented programs and consequently becoming less focused on the liberal arts.

1.2 A NEWCOMER: DISRUPTIVE INNOVATION

The 21st century presents another challenge toward independent liberal arts colleges with an unprecedented call for innovation. Clayton Christensen, Professor of Harvard Business School, contributed a significant dent to the mystery of why some innovations succeed when others fail, which, despite the business discourse, sheds a light upon how a surplus of less meaningful innovations cannot but perpetuate the stagnations in higher education.

Disruptive technologies, which offer cheap and effective solutions to unsatisfied customer needs, can displace high-end market incumbents often characterized by high cost and inadaptability to customer needs. Professor Christensen heavily contributed to the subsequent theory of disruptive innovation with elaborate cases from the business sector (e.g., triumph of Japanese automobiles over U.S. counterparts during the 1980s and 1990s) as well as a vision that this lesson could also be learned in higher education. So far, however, much less has been learned about the contextualization of the theory than about a few examples such as the Massive Open Online Course (MOOC). The theory is more likely to become a potent tool for the advancement of higher education if assimilated rather than imposed. To that end, conceptual domains of higher education insiders must be explored to complement the ongoing assessment of the DI examples. Given the great diversity of higher education institutions in the United States, it would be most ideal if a certain type of higher education institutions be targeted for optimally studying how the theory of disruptive innovation may or may not materialize in fundamental ways for American higher education.

1.3 THE PROBLEM

A number of factors narrowed the choice down to the American independent liberal arts colleges that are collectively in need of a transformational vision. The literature about liberal arts education in today's world suggested a very compelling divergence: While independent liberal arts colleges (LACs) in the United States have been slowly declining (Baker, Baldwin, and Makker 2012, Ferrall 2011, Breneman 1990), other parts of the world have been witnessing a rapid emergence (Dhawan et al. 2016, Lewis 2013, Labi 2011). Given the American origin of this particular type of higher education institutions, it seems more of a problem of the American LACs than of a crisis of liberal arts education in general.

It is clear that the American LACs have a tradition of being innovative, albeit less in an organizational and collective sense (Baker and Baldwin 2015). Strong and coherent manifestations reminiscent of the classic "Yale Report of 1828" are either missing or inadequate, leading to a dearth of transformational agendas as well as a polarity of institutional inertia and haphazard metamorphosis. According to the latest 2015 version of the Carnegie Classification of Institutions of Higher Education, the "Baccalaureate Colleges – Arts and Sciences Focus" category shrunk by 6.3 percent compared with the 2010 version, a trend that may also have caused 39 percent of the American LACs to become something else during 1990-2012 (Baker, Baldwin, and Makker 2012).

In the meantime, disruptive innovation has grown into an aggressive theoretical force that closes in from the business sector upon the social sector in recent years. Although the discourse of a marriage between disruptive innovation and higher education still rests upon relevance checking, the impact has already been felt with the entry of examples (e.g., MOOCs) and could reach a few subsectors of American higher education. In this sense, the American independent

liberal arts colleges must find themselves in a ready position to be able to respond to these examples and, to a greater extent, this theoretical challenge.

1.4 RESEARCH QUESTIONS

It is based upon a critical review of the literature that I shall proclaim my stance that can be broken down into two parts.

1. With the inspiration from the *non-competition* principle of the disruptive innovation theory that suggests, "something's better than nothing" (Glazer 2008, 78), I proclaim that this theory, though yet being assimilated by the higher education sector and much less the subsector of independent liberal arts colleges, is better at modeling the transformational change for the latter than fundamentally nothing at all in the past several decades.
2. For the theory of disruptive innovation to have a positive impact upon the transformational change of American independent liberal arts colleges, contextual assimilation is inevitable and requires more *empirical* research than is the case right now.

Following this stance, I chose to focus upon the three principles of the disruptive innovation theory, i.e., *non-competition*, *job-to-be-done*, and *unbundling*, in order to explore how this theory is assimilated in the context of American independent liberal arts colleges. I thereby proposed three research questions:

I. What is the level of awareness of disruptive innovation in the administrative context of contemporary American independent liberal arts colleges?

II. What institutional issues of American independent liberal arts colleges can be revealed using the three principles of disruptive innovation?

III. What challenges and opportunities exist in applying the disruptive innovation theory to institutional innovation of American independent liberal arts colleges?

The answers to the three research questions helped verify the following assumptions:

1. The American independent liberal arts colleges are collectively aware of the disruptive innovation theory to a certain degree;
2. Practical applications of disruptive innovation exist in American independent liberal arts colleges;
3. From a non-competition point of view, there are needs that can be served only or best by American independent liberal arts colleges;
4. From a job-to-be-done point of view, distinctive gaps exist between the needs and the institutional provisions;
5. From an unbundling point of view, the American independent liberal arts colleges strategically prioritize different institutional goals to different effects;
6. There are cases that disruptive innovation facilitates the institutional innovation of certain American independent liberal arts colleges; And
7. Variations exist among key administrative departments in terms of awareness and attitudes toward disruptive innovation, e.g., a chief information/financial officer is likely to be more aware or approving of disruptive innovation than a chief academic officer.

There is no intention of the author to threaten a venerable tradition of American higher education by introducing an imposing external force. The sole purpose and vision of this study is to invigorate and prolong this tradition by playing this external force to its advantage. It is difficult to avoid being rhetorical about “long live the humanities [and liberal arts]” (Andrews 2015, 3) on the part of many including the author, but at this point it is best to stay realistic about

the immediate future of these institutions. The theory of disruptive innovation materializes in a disruption of the incumbent by a surprising challenger, which is analogous to a higher education scenario where independent liberal arts colleges may become the challenger. It is my final assumption that these institutions, once revitalized by correct instruments, could become a disruptive innovation to American higher education. This, however, is still premature and will not be covered extensively in this study.

1.5 THE METHOD

This study used mixed methods to explore insiders' opinions on American independent liberal arts colleges through the perspective of disruptive innovation. The concept of disruptive innovation was operationalized into its three principles, i.e., non-competition, job-to-be-done, and unbundling.

Participants were determined through a two-step process: First, liberal arts colleges where potential participants are located were determined using the Carnegie Classification of Institutions of Higher Education. The concept of contemporary *liberal arts college* was then operationalized into 225 private non-for-profit Baccalaureate Colleges – Arts and Science Focus according to the latest 2015 version of the Classification. Second, from these target institutions, individuals with maximum potential exposure to disruptive innovation as well as say on institutional matters were invited, thus the selection of the equivalents of chief academic officer, chief information officer, and chief financial officer from each target institution.

An online survey was administered with ideally 675 (225*3) participants to collect quantitative data for descriptive statistical analysis. To complement the quantitative perspective,

20 in-depth content expert interviews were conducted to shed a qualitative light on the three research questions. Data analysis programs such as Stata and NVivo were utilized when necessary to find out: 1. College senior administration's variant perceptions of disruptive innovation in the context of American independent liberal arts colleges, and 2. according to the three principles of disruptive innovation, challenges and opportunities in terms of institutional innovation for contemporary American independent liberal arts colleges.

1.6 SIGNIFICANCE OF THE STUDY

Independent liberal arts colleges in the United States are in a lesser spotlight than many other higher education institutions. The lack of public attention raises an issue that is two-fold. First, merits of these century-old institutions as well as their cherished values are not known properly. Second, the same can also be said to their contemporary struggles. Both situations are in need of a change due to two trends: First, economic development and the ensuing democratic movement are turning some countries toward the unique model of American independent liberal arts colleges. Second, ironically, many of these colleges in the United States have been enduring a hard time of financial strain and mission creep.

The uncertainties of the American independent liberal arts colleges naturally render them susceptible to external forces. Being small, private, and in need of a change are all natural ingredients for disruptive innovation to take root and make an impact. The link-up between independent liberal arts colleges and disruptive innovation also provides an opportunity for the latter, arguably an *outsider* of higher education, to become an *insider* factor for the advancement

of American higher education. This, along with the need for spotlight, warrants the necessity and significance of empirical research such as this study.

That being said, this study contributed to the body of literature regarding not only contemporary mission and approach of American independent liberal arts colleges but also the manner of disruptive innovation entering a distinctive sub-sector of higher education. In a sense, it killed two birds with one stone.

2.0 LITERATURE REVIEW

Albert Einstein once said:

> It is not so very important for a person to learn facts. For that he does not really need a college. He can learn them from books. The value of an education in a liberal arts college is not the learning of many facts but the training of the mind to think something that cannot be learned from textbooks. (Frank 1947, 185)

Liberal arts colleges (LACs) represent a unique and perhaps the oldest kind of higher education institutions (HEIs) in the United States. According to the Association of American Colleges & Universities (Association of American Colleges & Universities 2015), LACs are defined as small and residential colleges that facilitate close interaction between faculty and students with a curriculum grounded in the liberal arts disciplines. With a historical dedication in nurturing lifelong freedom (Devane 1964) and responsible citizenship in individuals (Lang 1999), these institutions have been engineering a different approach to how students should be equipped to prosper in the contemporary world.

2.1 UNIQUE VALUES OF LIBERAL ARTS EDUCATION

Originating on the American soil back in the 17th century, LACs' contemporary existence speaks volumes of its educational vitality and resilience (Spellman 2009). Prior to early 19th

century where research universities and vocational schools had yet to emerge in swarms, small and often religiously-affiliated LACs were predominant after their American example, i.e., Harvard which itself was modeled after Emmanuel College of Cambridge University (StateUniversity.com Education Encyclopedia 2015). Young men of wealthy and educated families attended LACs to gain self-enrichment and necessary skills in order to actively participate in civic life (Jones 2012). The early exclusion of female students was joined by an early exclusion of specialized subjects due to the simple fact that vocational higher education was not in demand in the United States until the mid-19th century. As a result, students had relatively more time and energy to be devoted to a relatively leaner LAC curriculum. Following the curricular pattern of medieval universities that centered upon the *trivium* and the *quadrivium*[1], an LAC curriculum is aimed at helping students to be cultured in every possible aspect of the known world. LAC graduates are traditionally characterized by a deeper understanding of and appreciation for *freedom of mind* that proves to be their life-long guidance for civic actions in the society, something that is less typical of students with a specialized or vocational education.

The concept of LAC is preceded by that of *liberal arts* dating back to the era of Classical Antiquity. Since then, freedom of mind as an educational distinction has been pursued through different ways in different ages (Sorgner 2004). During the Roman Empire, education of liberal arts was intended for a contemplative life suitable to the freeborn who were, unlike slaves, free to pursue a life that was more than work (Jalbert 2009). During the Renaissance, liberal arts were instrumental to the rise of humanism that was antithetical to religious dogmatism (Ess 2003). It

[1] The *trivium* and *quadrivium* respectively represent *verbal* and *numerical* arts that were taught in medieval universities. The trivium comprised the subjects of grammar, logic, and rhetoric; the quadrivium comprised the subjects of arithmetic, geometry, music, and astronomy.

was not until 19th century that the concept of liberal arts morphed institutionally into a distinctive American model that was borrowed and adapted by other parts of the world in the following decades. Henceforth, LACs kept on its tradition of giving "little emphasis on vocational preparation or study in professional fields" (Baker, Baldwin, and Makker 2012) as well as educating students with a free mind.

Nurturing freedom of mind still largely constitutes the core of modern liberal arts curricula, despite being characterized by a variety of facets of this promise. Among many, universal development, communication of disciplinary knowledge, informed practice, and life-long learning are perhaps the most important.

2.1.1 Universal development

In a typical contemporary statement of liberal arts education such as that of the Roanoke College, freedom of mind is believed to be achievable with academic broadness and, at the same time, has a special purpose for career.

> [A liberal arts education] leads us out from small, safe worlds into larger, more interesting ones by training in us a dissatisfaction with partial knowledge, with sloganeering, and with fixed ideologies. It instills in us instead an appreciation for the true complexity of things and a lifelong commitment to learning… At Roanoke College, a liberal arts education prepares students for lives of freedom with purpose. The college aims to produce resourceful, informed, and responsible citizens prepared for *productive careers* and for leadership in community. (Roanoke College 2015, emphasis added)

This noble aspiration, however, belies a debate between academic breadth and specialization that has persisted for ages (Fix 2005). The ancient Greek philosopher Aristotle prophesized the debate by inquiring into the ultimate guidance of human practice (Willis 1988). The question of whether practice should be informed by "the useful in life", "virtue", or "higher knowledge"

(193) has been entertained ever since and especially contested at the rise of vocationalism in the early 19th century. The booming scientific discoveries at the time dramatically redefined occupations and required specialized knowledge from job seekers. New American colleges began to offer science and engineering programs in contrast to the old that continued to offer liberal arts programs (Horowitz 2005). As a result, *useful* education slowly found favor over *virtue* education, which was further reinforced by the introduction of research universities later in the century.

This historical transformation is sensible according to Charles Eliot, John Dewey, Frank Aydelotte, Alexander Meikelejohn, and Arthur Morgan who were prominent figures at the time as educational innovators (Lang 1999). Among them, Eliot's advocacy for a free elective system during his tenure as Harvard president largely dismissed prescribed liberal arts components which were reduced to only "freshman English, a second language, and progression from introductory to advanced courses" in 1870s (Sorum 2005, 36). Despite immediate challenge from James McCosh, then president of Princeton University, who engaged in a formal debate with Eliot in defense of a broad liberal arts education (McCosh 1885), Eliot's bigger triumph was perhaps over the "Yale Report of 1828" which was unable to contend with the tide of vocationalism in 19th century, albeit an all-time aegis for traditional liberal arts education.

The "Yale Report of 1828" coined the term *superior education* for vocational education to indicate that liberal arts education is *foundational*, rather than *inferior*.

> Who that aims at a well proportioned and superior education will remain ignorant of the elements of the various branches of the mathematics, or of history and antiquities, or of rhetoric and oratory, or natural philosophy, or astronomy, or chemistry, or mineralogy, or geology, or political economy, or mental and moral philosophy? (Yale College 1828, 19)

It was a time when liberal arts education was forced to develop a modern identity through reflection upon a very realistic and threatening nemesis (or so it seems), i.e., vocational education. Specifically, vocational education aims at providing specialized knowledge and skills so that students can prosper in their professional careers after graduation. In comparison, liberal arts education prepares students for all aspects of life so that they can prosper in more than just professional careers. Students who receive good vocational education will have a better opportunity in landing jobs. Students who receive good liberal arts education are trained to adapt skillfully and are more capable of making life decisions especially when landing jobs becomes difficult. In an environment where optimal job opportunities are rare, vocational school graduates may struggle in a situation where their skill sets do not match job demands, which is a familiar reality nowadays. In light of this, the "Yale Report of 1828" envisioned a future higher education architecture where liberal arts and vocational education can be integrated. In particular, vocational education should take place only in graduate schools for students who have successfully fulfilled all liberal arts education requirements en route to their baccalaureate degrees.

The "Yale Report of 1828" is a vital defense of liberal arts education at a time where new industries and job categories emerged as a result of major scientific advancements throughout the century. Liberal arts education was labeled old and incapable of facilitating employment, particularly for science and engineering occupations. Against the tide, the document reintroduced the virtues of liberal arts education in (1) universal development of mental faculties, (2) understanding and merging gaps between disciplinary knowledge, and (3) connecting theoretical and empirical understandings.

Following these principles, the LACs also recognized the particular human developmental phase where students leave families for a boarding education experience. This substitute role of parental control set LACs aside from vocational schools that care less about human development than skills training. In terms of broadness, liberal arts education is not teach-all education, but is purposefully linear, which is to "commence a thorough course, and to carry it as far as the time of residence here will allow" (Yale College 1828, 19). In other words, exposing students to many schools of knowledge is not the goal per se. Rather, it is a pre-requisite of a distinctive LAC pedagogy that will enable broadened and deepened understanding of the world.

2.1.2 Communication of disciplinary knowledge

Socrates praised human beings' natural pursuit of self-development toward good and success, just as "acorns 'aim to be' successful oak trees" (McPherran 2010, 529). While it is natural that acorns mature as oak trees instead of pine trees, there are realistic social forces that prevent students from becoming what they truly want to. Pressure from employment is one of many that misplace college graduates and cause them to become less successful. Research finding suggests that contemporary students select their college majors increasingly based on financial concerns rather than personal interests (Davis et al. 2013).

Despite this dilemma, teaching practices at LACs have been traditionally conducive to freedom of mind and loyal to students' natural pursuit of self-development. At a time where demands of specialization and competition for employment were less intense, the appropriate practices of teaching were alleged to "start where the students are" during the era of Socrates

(Swardson 2005, 178). Being less bound to academic disciplines or even institutions, teachers were driven to provide intellectual and moral guidance to the selected causes of their students.

The *elenchos*, a relatively theory-free teaching device, was applied in order to maximize conversations between teachers and students through minimizing the restrictive forces of intellectual and social norms. In conjunction with the elenchos, teachers would also encourage students to ask questions to the effect that they could recognize and appreciate the validity of opposing views. To facilitate the crucial stage of intellectual and moral development that takes place in 18-22 year olds, small-sized groups (later small-sized classes at LACs) were adopted to encourage maximum voice from each participating individual, of which Henry Noble McCracken termed the spirit as "a [fostering] reluctance to uniqueness and originality" (MacCracken 1939, 6).

The practice of asking questions is so central to liberal arts education that it was specially termed at the time of Ancient Greece as *aporia* which means a condition where a person is caught bemused in his/her academic inquiry. In the *Meno*, Socrates questioned Meno's understanding of *virtue* and, as a result, Meno succumbed to a state of mind as Rachel Kitzinger (2011) related to the script:

> For in truth I feel my soul and my tongue quite benumbed, and I am at a loss what answer to give you. And yet on countless occasions I have made abundant speeches on virtue to various people—and very good speeches they were, so I thought—but now I cannot say one word as to what it is. (6)

That state of mind, instead of resulting in inertia, is intrinsically sought after by liberal arts education as an indication of freedom from habitual thinking. Louis Menand (2010) characterized such willingness to and capability of asking seemingly disruptive (but actually constructive) questions as a key function of academia that as a whole voices and exercises what

the public feel unwilling to or incapable of. The approach to triggering that state of mind has been manifest in the pedagogies of liberal arts education where students and teachers alike are challenged to cross-disciplinary boundaries in search of aporia as well as a way to overcome it by thinking anew.

As often as would students find themselves fail to overcome aporia, teachers of liberal arts education play a tremendous role in facilitating the answering of a question that at a time amounts to impasse in a student's intellectual and/or moral development. By introducing students to the breadth of well-jointed human learning across a variety of disciplinary knowledge, a teacher tries to intellectually and emotionally engage his/her students, while being unhesitant to trigger and overcome his/her own aporia as a key component to the pedagogy. In doing so, the dynamic of teaching and learning as well as the power relations between teachers and students are so poised that students are constantly liberated and empowered to dictate their own learning.

Meanwhile, the focus on asking and answering good questions as opposed to solving practical problems is a key indicator that distances liberal arts education and LACs from other forms of higher education and institutions. LAC teachers also have a more dynamic role of associating different knowledge and are more immersed in teaching and learning relationships than advisors or counselors that are more common elsewhere.

2.1.3 Informed practice

Being so attached to asking and answering questions does not mean that liberal arts education and LACs are caged in theories. Adaptability to local and especially nuanced educational needs is a key strength of liberal arts education that has evolved across centuries. Gerard A. Postiglione

(2013) marveled at the temporal and spatial omnipresence of liberal arts education when he remarked that:

> The hype for the liberal arts is unmistakable. The logic goes that liberal-arts education, with its roots in ancient Greece and Rome, helped give birth to the Renaissance and the Enlightenment, permeated higher learning in modern France, England, and Germany, and made its way to the United States, where it came to underlie the greatness of American higher education. (par. 5)

By addressing the context of China as an example, Postiglione also stressed the contemporary relevance of liberal arts education, especially its institutional implication for macro higher education transformation initiatives in nuanced national contexts. He said

> All along the way, each of these nations adapted the liberal arts to align with its national character and the unique circumstances of its higher-education system. The argument goes that China is next in line to adapt liberal-arts education in its own way, with Chinese characteristics. (par. 5)

In an age that favors practical knowledge and insists upon outcomes, liberal arts education is often marginalized by public opinions as being less useful. Howard A. Doughty (2010) argued that the obsession with the vocabulary of *elitism*, *virtue education*, and *critical thinking* was not enough for constructing an effective plea for contemporary liberal arts education and LACs without substantial conceptual and/or institutional evolvement. On the bright side, liberal arts education is actually evolving in response to contemporary demands. Graduates of liberal arts are increasingly considered as strong job candidates by employers (Hersh 1997, Hart Research Associates 2013). In particular, these students show outstanding progression rates in business fields, especially in managerial skills compared with other students (Beck 1981, Supiano 2014). Findings also suggest that many LACs are in active strategic relationships with external educational programs and/or organizations. Imaginative ways of

blending liberal arts materials (e.g., Great Books) and/or pedagogical approach (e.g., emphasis on writing skills) with business programs have been identified and implemented despite further needs for exploration into program integration (Paris 2007).

However, these should suggest no further than that liberal arts education and LACs *can* adapt to the demand of being useful even though their heritage means more than usefulness. Even before technology turned into the prevailing norm of social and educational activities, Thomas Merton (1966) and Martin Heidegger (2014) had already warned of a servile state of mind toward the exclusively useful. Human beings are quantified as resources and have been increasingly susceptible to an education about "calculation, manipulation, and production" (Jalbert 2009, 228). As a result, the unique human faculty of *contemplation*, which is so endeared by liberal arts education and LACs, is deprived of natural development. John E. Jalbert (2009) characterized this human faculty as something that disrupts, challenges, undermines, and questions utilitarianism in higher education, which, if anything, is more useful than it seems. What liberal arts education and LACs particularly excel at doing is that they inform the proper use of contemplation so that students can thrive on things not only about means and necessity but also about knowledge and joy that end in themselves. To that, Aristotle (350 BC) in his *Politics* provided explicit elaboration and endorsement:

> It is evident, then, that there is a sort of education in which parents should train their sons, not as being useful or necessary, but because it is liberal or noble… It is clear that children should be instructed in some useful things—for example, in reading and writing—not only for their usefulness, but also because many other sorts of knowledge are acquired through them. (par. 5)

The faculty of contemplation can be nurtured by constant immersion in *leisure*[2], a state of being traditionally afforded by liberal arts education and LACs for the purpose of freedom of mind. This faculty, unobliged by normative powers of employment and occupation, matures (or regresses if unattended to) beyond graduation and defines usefulness with its own terms and all its sensibilities. Students well-versed in contemplation cultivate a mind that is "receptive, relaxed, ready, and even playful" (Burggraf and Grossenbacher 2007, 4), which prepares students not only for engagements in academic tasks but also for life encounters with necessary composure and resourcefulness.

2.1.4 Lifelong learning

Up to this point, it is important and only natural to understand that liberal arts education and LACs are not inferiors. They are alternatives that are best at what they are supposed to do, i.e., giving freedom to mind that benefits students overall as a person rather than an employee. Rene V. Arcilla (2014) labeled liberal arts education as *existential* as well as a source of answer to the question of why life is worth living.

> My thesis that these [liberal] arts aim above all to determine each of our natures and our ethical commitments amounts to the claim that nothing is more essential to our liberty than the opportunity to determine these things for ourselves. We each need to find out whether our understanding of these matters authentically fits our lives, and we need to be capable of demonstrating, testing, and deepening this understanding by living it out. *As long as we merely acquiesce in other's views in this regard, we remain effectively confined*. (23, emphasis added)

[2] The Greek term of *leisure (schole)* is the etymological root of *schola* in Latin and *schula* in German, both meaning *school* (Pieper 2009).

Speaking less from a philosophical point of view, students' ability to think freely is also contingent upon their temporal and spatial environments. While recognizing the synergy between business profession and liberal arts education, David C. Paris (2007) also urged greater understanding of life-long learning necessitated by competitive global marketplace. In the similar vein but taking a step further, Charles Ess (2003) compared a variety of culture-based liberal arts traditions (e.g., Aristotelian, Confucian, etc.) and envisioned a growing need for globalization with a means of technological nature.

As inevitable as this study will later develop toward the presumably promising clash between the notions of liberal arts/LACs and disruptive innovation (DI), it is more interesting than most to find no shortage of literature about life-long learning on the flip side. MOOCs, widely recognized as an archetype of DI in higher education, have been feverishly advocative of need-based education that spans across brick-and-mortar confinements. On one hand, MOOCs timely fill in the gaps between higher education and occupational requirements (Kiley 2012), as both remedial and advanced courses are made available in a self-service fashion. On the other hand, MOOCs have been increasingly identified as incomplete, with a lack of critical ingredients that prevent them from being truly successful in an educational sense. Laura Gibbs, a literature professor at the University of Oklahoma, went further to suggest that a nurturing atmosphere for collaboration is missing in MOOCs, something that is so advocated and abundant in liberal arts education and LACs.

> I think the real power of MOOCs is not as content delivery; I think the power of MOOCs is in getting people to create and collaborate together… This missing ingredient is educational communities that really work. (DeMause 2013, par. 27)

These resemblances and synergistic relationships between liberal arts education and DI shall not come as mere coincidences. However, at the very moment, liberal arts education and LACs in particular are in an awkward position of being miserly-represented, ill-construed, or even totally neglected. The noble pursuit for freedom of mind should sound just as pleasing as it is able to cut it in the contemporary times. But really, can liberal arts education and particularly LACs cut it?

2.2 CONTEMPORARY CHALLENGES FACING AMERICAN INDEPENDENT LIBERAL ARTS COLLEGES

Independent private liberal arts colleges (hereafter as LACs) are slowly disappearing from the landscape of American higher education (Breneman 1990, Baker, Baldwin, and Makker 2012). Aggravating financial difficulties (McPherson and Schapiro 1999), mission drift, and an overdue agenda for self-innovation (Roush 2012) are all conspiring with others to the slow demise of this long-cherished higher education legacy. As a way out, many LACs leapfrogged from their original Carnegie Classifications to become something else over the past 20 years, only to find themselves in another sunken ship. Vicki L. Baker and colleagues (2012) revisited David W. Breneman (1990)'s seminal article "Are We Losing Our Liberal Arts Colleges?" and found that as many as 39 percent have become no more after 22 years.

What is more alarming in this discourse is vested in a conceptual domain. Bruce A. Kimball (1995), in his acclaimed book *Orators and Philosophers*, synthesized two classical traditions of liberal arts education that historically alternated in ascendancy. The *orators*, down the line of Cicero and other rhetoricians, pursue practical use of text and learning to put forward social agendas; The *philosophers*, down the line of Socrates and other thinkers, pursue learning

in its own right. In his attempt to blend the two traditions, John Henry Newman (1907) envisioned a harmonious *gentleman* of consummate capabilities in both intellectual and practical requirements of a liberal arts education. Upon these lofty aims of an education, however, Thomas L. Benson (2003) warned of a significant decay of both classical traditions in modern era. While arguing for the relevance of contemporary orators and philosophers in the respective incarnations of "career education" and "territoriality of academic disciplines" (305), Benson, a retired president of Green Mountain College, was emphatic on that the decay could be found as much within both traditions as ever in their blend.

> The two strands of liberal arts thought have been substantially transformed and distorted in the modern era… Curiously, the contemporary descendants of the liberal arts rarely raised the standard or invoke the name of the liberal arts in defending their values. There is an unspoken but real sense of an historic divide, and liberal arts education is, for the most part, viewed as an anachronism. (306)

The inability to invoke those standards and values is, according to Benson (2003), largely due to a tradition deemphasizing measurable indicators and assessment schemes, especially when against a predominant tradition that emphasize these things. While not of an intention to make everything measurable at an independent liberal arts college, the lament is fully understandable given the task of a paradoxical nature:

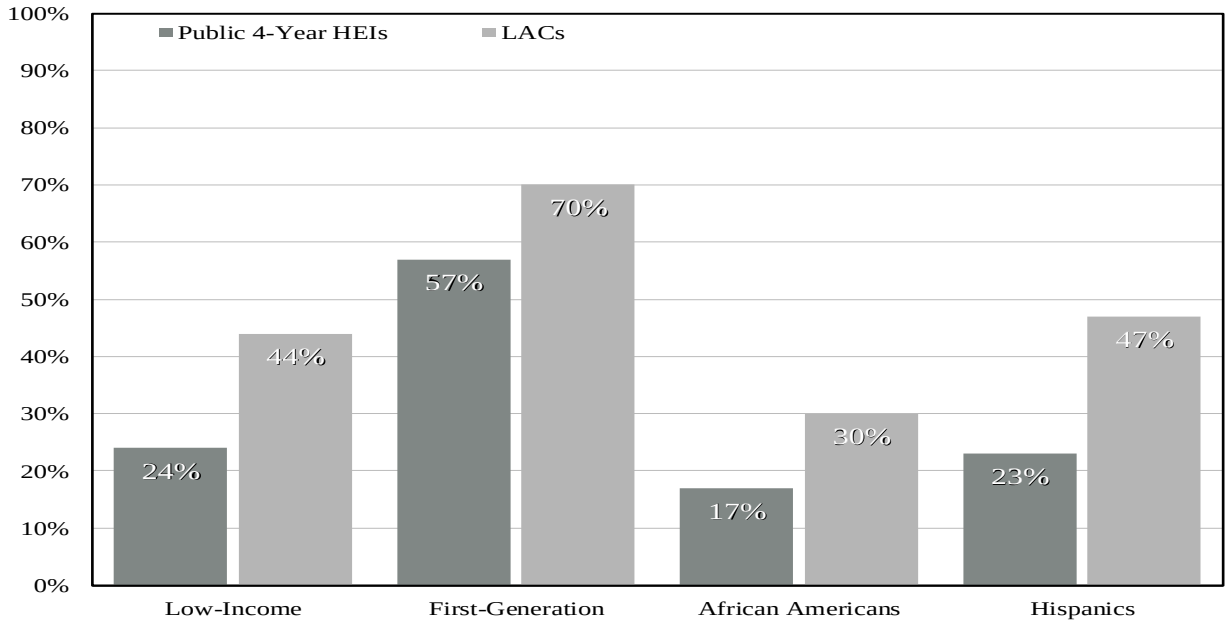
> To argue for a return to educational values that would erode if not replace these demonstrably effective programs is to argue against success. (306)

But has *success* grown homogenous in nature as well as *failure* over the years? These established the core of the dilemma for contemporary independent liberal arts colleges in the United States. They also opened a small window through which a variety of consequences are displayed.

2.2.1 Causes for optimism

It is rational to be certain about the boundary of this dilemma going forward, and there are actually reasons on the surface for optimism. For one, teaching and learning based on close faculty-student and peer interaction that is typical of LACs are still highly effective (Pascarella and Terenzini 2005, Braskamp, Trautvetter, and Ward 2008, Kuh et al. 2010). LACs also enjoy higher average graduation rates and lower attrition rates than public four-year institutions (National Center for Education Statistics 2014). Regarding the "at-risk" student category, i.e., low-income, first-generation, ethnic minorities, etc., LACs hold a noticeable advantage in graduation rates compared with institutions of comparable percentages of these students (see Figure 1).

Figure 1. Graduation rates of "at-risk" students at public 4-year HEIs and LACs.



Source: The Council of Independent Colleges (2014a).

STEM education, which is a traditional strength of large research universities, is not foreign to smaller LACs. Despite criticism upon their contemporary relevance to social demands, LACs actually graduated higher percentage of bachelor's degrees in STEM fields (59 percent) than public non-doctoral and doctoral institutions (31 and 56 percent respectively) according to NCES' 2004-2009 Beginning Postsecondary Students Longitudinal Study (The Council of Independent Colleges 2014b). Students of LACs also spend less time on their bachelor's degrees in STEM fields. Based on NCES' 2008-2009 Baccalaureate and Beyond Longitudinal Study, 80 percent of them obtained their degrees within four years while the figures drop to 34 and 52 percent respectively for public non-doctoral and doctoral institutions. In addition, LAC graduates are more likely to pursue doctoral degrees in STEM fields than their peers from public four-year institutions and have actually produced as many or more science majors who obtain PhDs than large research universities. As an example, Richard Ekman (2014), current president of the Council of Independent Colleges, found that 36 percent of the students graduating from Allegheny College with a bachelor's degree in chemistry between 2001 and 2005 subsequently earned a PhD in the discipline, a figure higher than the University of Pittsburgh (13 percent) and Carnegie Mellon University (24 percent). Despite a much lower undergraduate population, a comparable output of 25 graduates from Allegheny College received a doctorate in chemistry between 2006 and 2010, compared with 30 and 25 respectively from the University of Pittsburgh and Carnegie Mellon University.

LACs also foster more diversity-related experiences than other HEIs, which is positively related with a number of student outcomes (Kuh 2001, Pascarella and Terenzini 2005, Umbach and Kuh 2006). Historically, LACs pioneered or facilitated a series of key pedagogical experimentation, including Beaver College's "Writing across the Curriculum" initiative in the

1970s, experiential learning, and undergraduate research movement (The Council of Independent Colleges 2011).

It is clear that American LACs are not doing badly across the board, as many even outperform other HEIs in the areas highly expected by the national agenda for higher education reform. However, it is hard to pretend there are no challenges. Big ones.

2.2.2 The challenges

2.2.2.1 Financial difficulties: A domino effect starting from demand. In the book *Liberal Arts at the Brink*, Victor E. Ferrall, Jr (2011), President Emeritus of Beloit College, made it very clear that the greatest challenge of contemporary LACs is a financial one. Depleting endowments, extreme disparity of wealth, forced price-cutting, and a lowered demand from the public contribute together to the financial woes of the mostly private LACs.

What makes this financial problem essentially different from one experienced at a public university is a lowered demand for liberal arts education. In Ferrall (2011)'s words, "resuscitating demand for liberal arts education is the single greatest challenge liberal arts colleges face" (4), because it triggers a domino effect of price cutting by the richest LACs, which causes other LACs simply unable to cope due to a depleting endowment up to 30 times smaller (see Table 1). In the 4-tier spectrum of college endowments covering 225 sample institutions, it shows significant financial disparities not only across but also within tiers. And with the evenly distributed institutions across the four tiers, a large number of lower-tier institutions will struggle financially to meet the visions and standards often set by the most well-off institutions. Inability to do so will certainly disinterest prospective students from the perspective of learning experiences and outcomes.

Table 1. 2007-2008 market value of 225 private LACs' endowment assets ($000).

Tier	*Range*	*Average*	*Median*
I (51)	$78,000 – $1,800,000	$662,000	$550,000
II (68)	$14,000 – $1,000,000	$184,000	$140,000
III (63)	$13,000 – $367,000	$70,000	$61,000
IV (43)	$1,800 – $75,000	$21,000	$15,000

Source: National Association of College and University Business Officers (2009).

Raising tuition beyond the range of $46,902—$54,410 per year[3] is certainly not more appealing to the already disinterested public, nor is it facilitated by demographical facts. The shrinking size of traditional college-age population as well as an uneven distribution in favor of the South are disadvantaging the LACs financially. According to Ekman (2014),

> There are many potential college-goers in the Southeast and Southwest, but these locales are also where low-income and first-generation students… account for large percentages of the traditional college-age population… [In a discourse of] attracting and retaining students, tuition-dependent small institutions [concentrated in the Northeast and Midwest] are particularly hard hit by fluctuating enrollments. (25)

It makes tuition a much less viable leverage for alleviate the financial difficulties.

Drastic approaches have been taken by the mid-to-low tier LACs while the more well-off stay largely indifferent. Breneman (1990)'s earlier warning of a metamorphosis of American LACs and Paul Neely (1999)'s revelation of a divergence between elite and lesser LACs were well-combined another decade later, as

> Second-tier liberal arts colleges become more like small comprehensive colleges and universities as they continue to add vocational programs. In contrast, the well-endowed elite liberal arts colleges as potentially becoming an educational anachronism, centers of economic privilege too few in number and too isolated to influence higher education in general. (Baker, Baldwin, and Makker 2012, par. 22)

[3] In 2009-2010, about half of the 100 most expensive college and universities in the United States are LACs, with a cost range of $46,902—$54,410 per year. Harvard was ranked 112th (Campus Grotto 2009).

While LACs enroll students mainly from in-state high schools, Ekman (2014) also noticed that few was considered to be comparable contributors in absorbing enrollments as state universities that are much more appealing to state budget officers. The situation is barely different even in states whose public systems are struggling with capacity that LACs may be able to provide.

It is only natural that many LACs began to resort to cost-cutting measures, even with administrative costs sometimes growing at a faster rate than instructional costs (The American Council of Trustees and Alumni 2014). However, Ekman (2014) warned of a more desperate measure concerning reducing course requirements and even cutting entire programs:

> No college or university can reduce programs and services indefinitely and hope to remain competitive in attracting students. For smaller institutions, the elimination of a course, a program, or an extracurricular activity is especially likely to be noticed. (26)

LACs have much less leeway than public universities when it comes to cutting programs and/or services in order to stay financially healthy. This is because not only are there fewer programs to be cut at LACs, but also the cut programs are often unable to release sufficient resources. In addition, the smaller sizes of LACs make it harder for negative impact to go unnoticed by faculty members, students, and other stakeholders who will not be pleased and will most likely turn suspicious of any new program brought in with a different purpose (Neely 1999).

2.2.2.2 Mission creep: A decay from within. The more prosperous and reputable LACs are not in an impeccable position, either. The American Council of Trustees and Alumni (2014) recently dispelled this optimistic illusion by suggesting that graduates of elite LACs are increasingly ignorant of what constitutes the basic knowledge of a liberal arts education:

> They don’t know the term lengths of members of Congress, and they can’t identify the general at the Battle of Yorktown or the father of the United States Constitution. (p. i.)

While many LACs have been trying to defend themselves through vocalizing winsome values such as *critical thinking* and *global citizenship* (Wood and Toscano 2013, The American Council of Trustees and Alumni 2014), even the top-ranked LACs are no strangers to substance-abuse related incidents on campus (The Associated Press 2010, LaDuca 2012, Lyon 2013) due to growing leniency in academic requirements. From the sole perspective of grade inflation, Stuart Rojstaczer and Christopher Healy (2012) found that grading at private HEIs and schools focusing on liberal arts is more forgiving than at public HEIs and schools focusing on science and engineering respectively. Regarding elite LACs,

> Williams College saw its average GPA increase by .66; Wellesley's by .82 [during 1960-2000]. Vassar saw the average GPA of its graduating class increase from 3.12 to 3.48 from 1990 to 2008, while the average grade awarded at Bowdoin jumped from a 3.06 to a 3.33 during the period from 1991 to 2004. (The American Council of Trustees and Alumni 2014, 10)

If the rule of thumb holds true that "college students should devote two hours of study time for every hour of class time" (McCormick 2011, par. 2), then the average of only 16.33 hours devoted to off-class study per 7-day week for a 15-credit-hour full-time LAC student (Center for Postsecondary Research 2014) falls well below that standard, which is at odds with the trend of grade inflation and thereby places a doubt upon LACs' academic quality.

Perhaps more worrying than most is LACs' doubt in themselves. As employers become more vocal about how a *good* college education should look like (Hart Research Associates 2013), even the top-ranked LACs hastened to conform at the peril of total capitulation. The American Council of Trustees and Alumni (2014) examined the curricula of 29 elite LACs and

found that, based on the seven key subjects that traditionally constitute a core curriculum[4], none of them required all seven subjects for general education, with 20 requiring three or fewer and 5 requiring NONE. If we also consider that the percentage of graduates from the top 225 private LACs with vocational majors almost tripled from 10.6 percent to 28.7 percent during 1987-2008 (Ferrall 2011, 57), we may as well acquiesce in a simple conclusion: the heart of American LACs is being usurped.

2.2.2.3 A break for contemplation. Can we come to a conclusion that American LACs as a whole is finished? The answer is no, because in spite of a diminishing demand for *liberal arts education* (Ferrall 2011), LACs are still capable of producing the type of students that are highly demanded in the job market. Findings suggest that LAC graduates are traditionally and increasingly considered as strong job candidates by employers (Hersh 1997, Hart Research Associates 2013). In particular, college students with an academic preparation in liberal arts majors show outstanding progression rates in business fields as well as exceptional competency levels in managerial areas (Beck 1981, Supiano 2014). That calls for further scrutiny of the diminishing demand for *liberal arts education*. In other words, what did LACs do (or not thereof) to have kept *students* away?

It seems that what jeopardizes contemporary American LACs the most is not demand per se, nor a threatening external presence, but something else. It is peculiar that LACs are doing well in terms of helping students find jobs after graduation without being historically dedicated to it. But it would be absurd if they feel content with it and pretend the diminishing demand for liberal arts education would all but mean nothing. What is wrong in terms of education must be

[4] According to the report, the seven subjects are "Composition, Literature, intermediate-level Foreign Language, U.S. Government or History, Economics, Mathematics, and Natural or Physical Science" (6).

done right regardless. LACs are for the sake of liberal arts. If they are no longer, they must be fixed.

Throwing the baby out with the bathwater is easily the worst strategy for LACs in times of change, especially considering they are among the most historically resilient and innovative HEIs in the United States (Chopp, Frost, and Weiss 2013). The Morrill Act of 1862 and the GI Bill are two prominent milestones of American higher education upon which new forms of colleges and programs were called upon to recognize and satisfy emerging needs. However, the introduction of land grant universities and GI Bill programs did not eliminate the historical LACs which had been around for much longer with a distinctively different vision and approach to higher education. They became their better selves and are actively relevant today. Nonetheless, this resilience is pending serious relevance checking also. Are they becoming hopelessly anachronistic (Neely 1999, Delbanco 2012)? Or are they still their selves after a time perhaps already too long?

Of all the influences that may erode the resilience of American LACs, there is one thing in particular: College degrees no longer speak for themselves. Compared with the time of Henry Brooks Adams whose undergraduate education at Harvard College (1854-1858) was thought as the "next regular step" toward "social respect" (Ferrall 2011, 40), nowadays a college degree is only as important as it can secure a job *by effectively mixing with other factors*. Being able to satisfy social, governmental, and corporate demands is such a huge factor that neither historically nor naturally mixes with an LAC degree. They simply don't translate each other very well. However, the fact of Williams College leading the Forbes ranking of America's Top Colleges again in 2014 (Forbes 2014) still proves too baffling to call it an end just yet.

There must be a way to turn the whole thing around. An innovative way.

2.2.2.4 Self-Innovation: An agenda overdue. Colleges and universities traditionally serve three social functions: teaching, research, and service. These functions are carried out primarily by faculty members and therefore are deeply influenced by their capacities and actual performance. Findings suggest that heavy faculty workload is a major factor of unbalanced commitment as well as low-quality fulfillment of the three functions. In particular, Howard Mancing (1994) found that LACs averaged 75%-10%-15% in terms of time spent on teaching, research, and service compared with research universities' 40%-40%-20%. On the other hand, Katherine O'Connor and colleagues (2011) found that faculty members "trying to be everything to everyone" (7) due to structural deficiencies of their institutions are more likely to perform below standards.

With only so much time in a day, minus the amount increasingly advocated for faculty work-life balance (Lester 2013), it is no wonder classical and modern discourses of higher education institutions dwell largely upon how to *make do with a small pie*: Should we concur with John Henry Newman (1907) on that the object of a university is "the diffusion and extension of knowledge rather than the advancement" (ix) or is research more important nowadays? With no genuine intention to join this debate, the sole purpose here is to call attention to a question less frequently asked: *Do colleges and universities really have to be everything to everyone?* To put it into perspective, how can the research carried out at an LAC measure up to a social function if its faculty members spend only 10 percent of their time on it?

Higher education does not have to monopolize the social functions of teaching, research, and service. Actually, it can't. For instance, only less than a quarter of research in the developed countries is undertaken within higher education institutions (Bleiklie and Henkel 2005). In the United States, the sheer number of over 4000 colleges and universities tends to overstate the

economies of scale to the point of monopoly although most of the institutions are relatively small (Hansmann 1999). Public subsidy is also reminiscent of monopoly. But again, higher education in the United States is less of a public good (even less so for American LACs which are mostly private) than in countries such as Italy with a highly centralized national university system. Perhaps the closest semblance of monopoly comes by virtue of *students* who are not yet spoiled for choice. But if students go to college *in order to* find good jobs afterwards, they will replace college with something that can help them find better jobs, because after all higher education is a means to an end.

In a nutshell, it is important for American higher education and LACs in particular to understand that they are not always atop the pecking order of teaching, research, and service, which, I would argue, is the single greatest challenge in terms of self-innovation. The challenge can be broken down into three dimensions:

Complacency*: We Are in the Business for So Long, So Why Should We Worry Now?* The subtlety of this mentality is more manifest in ACT (2013), an issue brief detailing that only 68 percent of the American high school graduates went to college in 2010, compared with 92 percent in 2004. With all due respect, the study attributed the decrease primarily to low academic preparation and demographic factors, without weighing the possibility that some among the outbound 24 percent might have found greener pastures. Such possibilities will never be verified if colleges and universities believe that there will no longer be dropouts like Bill Gates or Harrison Ford and that *bringing them back* is an absolute imperative.

Confusion*: Okay, But How Should We Serve Who?* Even if colleges and universities recognize the reshuffled pecking order of teaching, research, and service, many will find their quest for change often frustrated by a confusion between *innovation* and *technology*. This confusion tends

to exaggerate the impact of technology while understating its integration to more impactful *product* and *process* innovation (Piper 2008, Jin and Du 2014). Innovation can happen without necessarily the presence of technology (Schmidt and Rammer 2007, Pereira and Romero 2013), but technology is only truly impactful when applied with innovative ideas. A prime example of this confusion is that many colleges and universities have been joining MOOCs without understanding and capitalizing on the powerful concept behind it. A second layer of confusion is related to the broadening scope of missions of higher education. Colleges and universities are held increasingly accountable to government, industry, community, and the broader society. Even students, a more traditional stakeholder, must now be served in a non-traditional way. Statistics show that in 2012, 40 percent of undergraduates in the United States were 25 or older whose population was projected to grow twice as fast as traditionally-aged students (21.7 percent versus 8.7 percent) by 2022 (CLASP-Center for Postsecondary Economic Success 2015). It is foreseeable that colleges and universities will have a hard time aligning needs and refocusing on their core missions.

Cooperation and Competition*: But We Don't Talk with Each Other…* What seems to be less confusing to American LACs may actually turn out just the opposite. Traditionally focusing on liberal arts education that is less tech-savvy, many LACs are now taking their chances in vocational and online education with hugely varying results (Breneman 1990, Brint et al. 2005, Baker, Baldwin, and Makker 2012, Scholz 2013). There are certainly inspiring prospects. In 2012, Wellesley College announced its strategic approach to MOOCs by planning to become the first LAC to join edX (Shennan 2013). The initiative was believed to encourage other LACs to explore "pedagogical innovation" with the help of "technological advances" (par. 5). However, it

is too early to assert that this is the kind of example to follow, not to mention LACs traditionally do not follow examples of their peers.

According to Ferrall (2011), neither institutional cooperation nor competition has affected LACs as positively as is the case with other higher education institutions.

> Competition has done little—probably nothing—to enhance the quality of liberal arts education, although it has led some, colleges to invest in glitzy facilities and faculty workload reductions the colleges cannot afford and the need for which is doubtful at best. (81)

As regards cooperation,

> Effective cooperation requires stronger colleges to collaborate with those that are weaker, which many [LACs] are reluctant to do. Most have been even more reluctant to give up total autonomy in their operations, especially in their curriculums. (81-82)

Even the Annapolis Group, the first and only national consortium solely concerned with the needs of LACs, was deemed ineffective in its "leadership role for cooperation" (4).

Introducing MOOCs and social communication technologies to pedagogical innovation are laudable efforts to say the least. However, apart from their long-term impact that is still up in the air, LACs are poised dangerously over a trap of willful improvisation due to a lack of common ground for significant self-innovation.

2.2.3 A short summary

The independent liberal arts colleges in the United States are becoming an increasingly diverse group as a result of how they reacted to a hostile financial environment as well as an urgent quest of identify reshaping. Those which do extremely well and their less excellent peers alike are

charged with a mission to innovate across a broader scope of academic, technological, and financial domains in order to stay focused and effective on their historical mission which is liberal arts education. So far, a few key points are ripe for concluding this section:

1. The American LACs are more alive than dead;
2. The demand for college graduates with skills pertaining to liberal arts is on the rise, but the demand for liberal arts education is in decline;
3. The American LACs are afloat with an unclear identity;
4. Higher Education institutions and LACs in particular are not always atop the pecking order of teaching, research, and service; and
5. The American LACs are facing the "C-" challenges in terms of self-innovation.

It is safe to say that the American LACs cannot be written off just yet. However, without determination to sound a modern declaration like the "Yale Report of 1828" has done for the past generations, and without a modern tool for that purpose, it may all but end up too late. LACs need a declaration. And they need a tool, a disruptive one.

2.3 WHAT DOES DISRUPTIVE INNOVATION BRING TO THE TABLE?

Clayton M. Christensen could not be unfamiliar with what was to become of innovation in the business sector 18 years after he published his visionary book, *The Innovator's Dilemma,* in 1997. Dynamic as is his theory of disruptive innovation (DI) that has already spread to the sectors of healthcare and higher education, the latter seems to be a more untraveled path, let alone one of its farthest recesses, i.e., LACs. Admirably, Professor Christensen has been trying and is still trying today.

2.3.1 Disruptive innovation and sustaining innovation

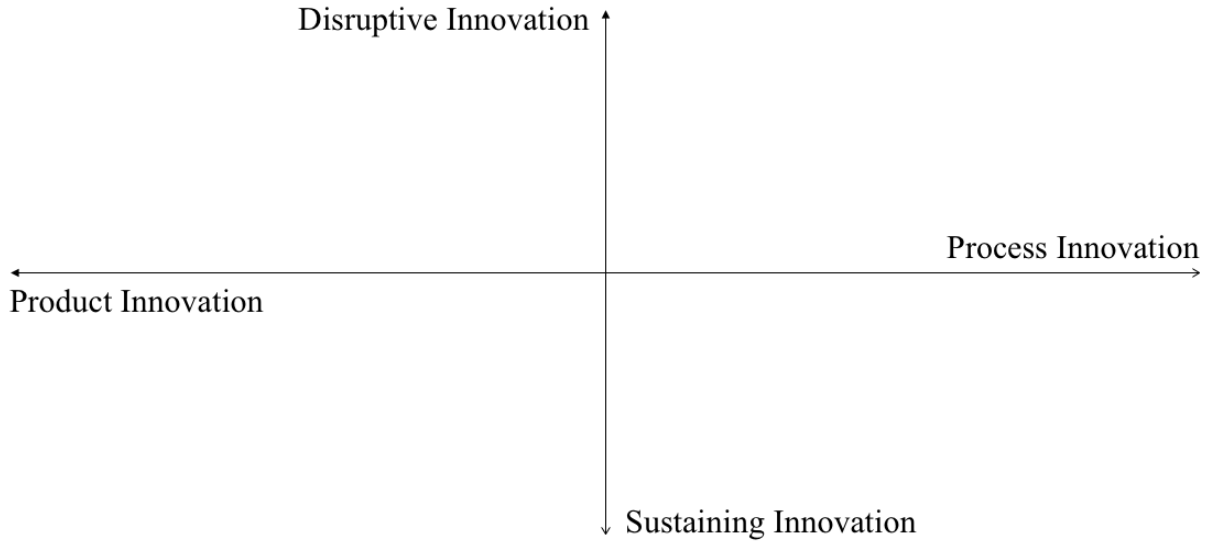
Higher education in the United States is facing a unique challenge in using technology meaningfully and effectively (Glenn 2008, Hall 2010, Norris et al. 2013). What makes this challenge a hard one is largely due to how differently *innovation* can be understood (Schmidt and Rammer 2007, Pereira and Romero 2013) and how often people tend to confuse *technology* with *innovation* (Kelly and Hess 2013). The necessity for a salient discourse of innovation in higher education is perhaps best summarized as follows:

> In a time when new technologies swirl about us in great numbers, the art of managing innovation, experimentation, and piloting seems more crucial than ever… Of course, we do innovate, but many times we do so in a way that we simply inherited when we arrived at our campus. If our methodologies are correct, if they truly serve us, then those experiences become positive results that help us all move forward. (Diaz and Brown 2013, 2)

Christensen's contribution to this burgeoning discourse is a bipolar continuum where any innovation initiative can be found somewhere between *sustaining* and *disruptive*. This continuum can be integrated to the product-process discourse to form a revealing construct that can tell the "nature" of innovation. The *sustaining* extreme of this construct or *sustaining innovation (SI)* influences innovation initiatives in such a way that they are relatively slow, long-term, and incremental (Marshall 2010). In higher education, colleges and universities bring in educational technology to enhance or replace traditional ways of teaching, learning, and research. Constant maintenance and regular upgrades then ensure that the investing institution is always competitive among its peers, at least from the technological perspective. Findings suggest that many higher education institutions fall under quadrant three in Figure 2 as their innovation initiatives are often product/technology-driven and sustaining-minded (Hanover Research 2013).

Unlike the followers of SI, there rose in the past two decades a few theorists believing in a drastically different way of innovation. Led by the Harvard Business School Professor, Clayton M. Christensen, these theorists believe in the revolutionary potential of *disruptive innovation* (hereafter as *DI*) that is thought capable of curing the malaise of higher education in the United States (Christensen 1997, Christensen and Horn 2008, Christensen and Eyring 2011). Despite a small patronage from academia (Diaz and Brown 2013), DI generated a tangible and growing impact with its emphasis on rethinking the core issues of need, access, cost, and outcome, advocating that higher education should and can be anything and anywhere for those in need.

Figure 2. Four quadrants of innovation.



The rise of DI causes SI to be scrutinized, particularly upon its negative tendency to "retrofit" (Kelly and Hess 2013, 4), which in practice is to graft educational technology on top of "existing routines" (3). Neither does retrofitting help keep down the flying tuitions. Russ Poulin

(2012)'s nationwide survey of 199 HEIs revealed that 93 percent of those institutions charged the same or higher tuition for their online programs than their *separate* traditional face-to-face programs. Rather than foster new ideas and integrated practices, these institutions were found to be reinventing old structures and existing routines.

2.3.2 MOOC: An example of DI in higher education

Criticisms upon retrofitting innovation in higher education partly explain the outburst of DI, with one of its examples, mass open online courses (hereafter as MOOCs), taking the front seat. MOOCs helped fill a few gaps in higher education. Kevin Kiley (2012) suggested that MOOCs are useful in helping students transition from higher education to employment. Neil DeMause (2013) chimed in by suggesting that MOOCs also help promote lifelong learning. Researchers of higher education are also concerned about MOOCs' value as an analytical tool. As an example, Jennifer Chu (2013) and R. F. Mackay (2013) found that MOOCs facilitated mass analysis of learning outcomes and enhanced learning analytics and data mining.

It is inevitable to examine MOOCs vis-a-vis traditional higher education from a business model perspective. Before MOOCs went rampant in the midst of 2012, Anya Kamenetz (2010) had warned that the bundled model of traditional higher education is incongruent with the trend of increasingly nuanced learning needs. Non-traditional students, an ever-broadening category pertaining to such attributes as age, residence, and employment status (National Center for Education Statistics 2015), are beckoning to colleges and universities for significant systemic change (Soares 2013). Jeffrey M. Johnson (2014) reported that non-traditional students generally had a low perceived academic entitlement which is at odds with the predominant culture of

academia. Above all, student engagement becomes even harder than it traditionally is. According to Paula Baron and Lillian Corbin (2012):

> Ideas about student engagement in the university context are often fragmented, contradictory and confused. Even the meaning of the term 'student engagement' is uncertain. (759)

On that note, Vicki Trowler (2015) further challenged the "essentialist" (296) view of student engagement for non-traditional students and introduced *chaotic conceptions*, an approach about disaggregation into simpler concepts in order to obtain the "rich totality of many determinations and relations" (Marx 1973, 100).

The quest for unbundling the model has led to further scrutiny of the bundled and potential unbundlers in higher education. Randy Bass (2012) envisioned MOOCs as a leverage for engineering a "re-centered core" (26) of higher education that is to shift from bundled formal curriculum and courses to unbundled high-impact informal learning. MOOCs are also thought to be able to weaken the role of colleges and universities as mediators between content and learners (Siemens and Matheos 2010), an argument Claudia W. Scholz (2013) reinforced by suggesting that service-minded providers are becoming serious competitors of education-minded traditional HEIs. Sharing Robert B. Barr and John Tagg (1995)'s vision of a paradigmatic shift from teaching to learning in higher education, Bass (2012) suggested that "experiential modes of learning" (24) are worryingly becoming as available from external providers as from colleges and universities, if not more.

Those looming impact of MOOCs, however, is found hard to materialize when it comes to the challenges of strategy, leadership (Marshall 2013), and quality assurance (Rosewell and Jansen 2014). As much as people talk about how MOOCs may threaten the business model of traditional higher education, findings suggest that no standard business model exists yet for

MOOCs right now (Haggard 2013, Nadeem 2013, Voss 2013). MOOCs generally offer non-degree certification at best and have been fighting a tedious battle with federal and state regulations for accreditation (Eaton 2012) and other forms of recognition (Jobe, Östlund, and Svensson 2014). Despite mass participation, completion rates of MOOCs are way lower than those of traditional courses offered on campus, usually below 13 percent (Onah, Sinclair, and Boyatt 2014, 5825). Of those who complete the courses, growing concerns have been expressed toward the integrity of the evaluation frameworks and design (Grover et al. 2013). Perhaps the greatest uncertainty is around the individualistic style of learning that may result in a redefined role of teaching as well as a compatible new institutional structure. More attention and resources have been committed to individualized learners than to teachers (Ross et al. 2014) and infrastructure optimization, which Glenn M. Kleiman and colleagues (2015) summarized as follows:

> Many digital learning initiatives have not been successful because they focused on the technology infrastructure without sufficient attention to the human infrastructure — the teachers and administrators who need to learn and update their practices. (6)

That MOOCs do not possess a salient business model yet is hard to go around for all the doomsayers of traditional higher education. Despite often higher development and delivery costs than of traditional courses (Hollands and Tirthali 2014), MOOCs can be joined for free and only incur charges when users seek to acquire certification by completing a particular course. However, even that slight semblance of business model, which boils down to paid certification, is dampened by suspicion from MOOC participants (Wintrup et al. 2015) as well as business employers (Attis, Koproske, and Miller 2012), the latter potentially due to slower literacy of MOOCs than the former (Horn 2014). In addition, a great number of users place experiencing

MOOCs higher than acquiring certification, to the effect that many drop their courses midway once their curiosity or personal learning goals are fulfilled (Onah, Sinclair, and Boyatt 2014). After all, terminal degree is still the firm norm of educational credential than certificate when it comes to overall competitiveness in the job market.

It is hard to admit MOOCs as an adequate DI with such and one additional concern: The concept of disruptive innovation is often overshadowed by that of *disruptive technology* that MOOCs so heavily depend upon. Andrew P. Kelly and Frederick M. Hess (2013) warned of persisting confusion between innovation and technology and called for further exploration of the real driving force behind MOOCs. Also recognizing but not exaggerating the role of technology in change initiatives, Stephen J. Marshall (2010) argued that technology by default is neither sustaining nor disruptive without mingling with other change agents. Gene E. Hall (2010) weighed in by suggesting that technology alone does not constitute a theoretical construct and calling for attention to its embedded application in change processes.

That MOOCs are altogether a flawed attempt on DI in higher education should help refocus our attention on DI itself. To do that, it is impossible to go around Christensen's and his colleagues' seminal contributions.

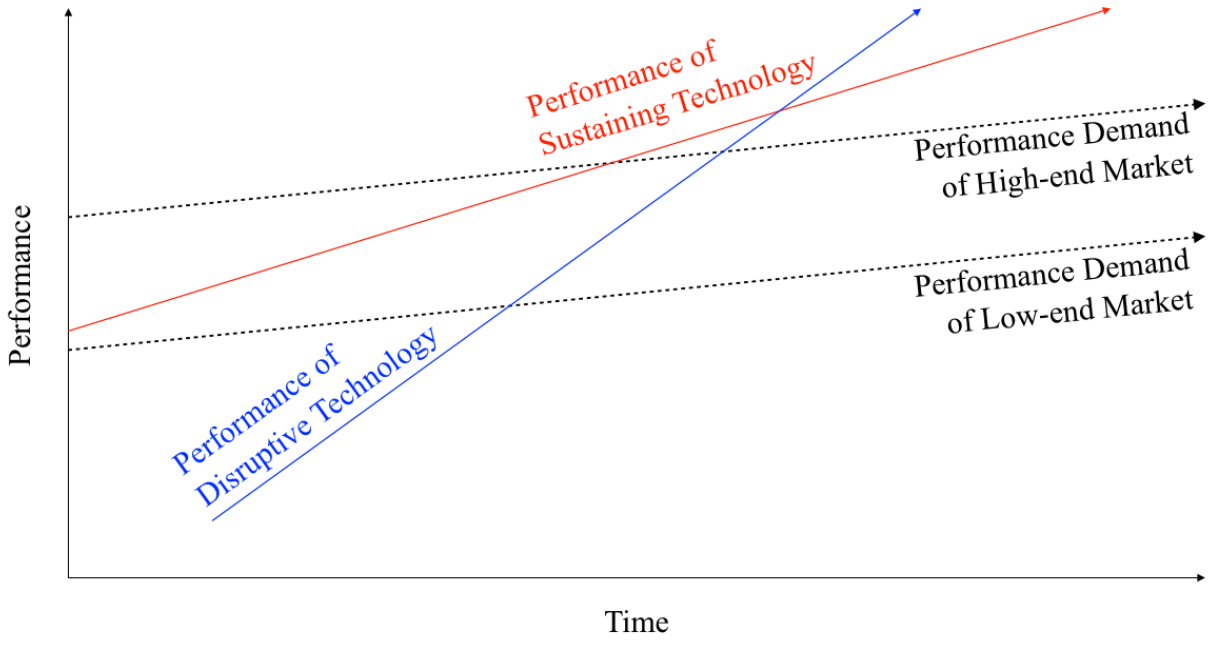
2.3.3 The theory of DI

The term of disruptive innovation was coined in *The Innovator's Dilemma* when Christensen and his colleague Joseph L. Bower decided to replace the term of disruptive technology that they popularized two years before in the 1995 article "Disruptive Technologies: Catching the Wave". Through studying a number of once highly successful businesses across different industries, Christensen (1997) attributed their surprising collapse to an ever-widening

gap between technological progress and market-demanded performance. In a nutshell, "technology supply may not equal market demand" (16). Often times it outpaces the latter. Due to this disequilibrium, an improved technology may find it harder to maintain its market competitiveness than it was before. Those businesses under study were found invariably overcommitted to high-end technological competition and consequently conceded their mid-to-low end market to less advanced and cheaper disruptive technologies that were able to satisfy a hugely unheeded market demand.

Figure 3 illustrates how technology interacts with market demand in a dynamic way. Performance demand of high-end market rises gradually and always exceeds demand of low-end market. The red solid line represents advancing performance of a sustaining technology that is attracted to high-end market. The sustaining technology meets a certain performance demand when the red solid line crosscuts the area between the dotted lines.

Figure 3. How does a disruptive technology disrupt?



Source: Christensen (1997).

For a sustaining technology to stay competitive in the market, its performance *must* keep somewhere between the dotted lines. However, Christensen (1997) found that technological performance and performance demand barely keep pace with each other, which causes unparallel progressions and hence the cross-cut in the figure. It creates a dilemma for any sustaining technology: After satisfying the top-end performance demand, it starts to lose out due to overdevelopment and exponentially costly but unrewarding reinvestments. In a nutshell, its performance *cannot* keep between the dotted lines indefinitely.

What is left behind by sustaining technologies is an ever vacated mid-to-low end market with growingly un-served demands. A disruptive technology is able to pick up the slack and eventually oust a reigning sustaining technology by virtue of three DI principles.

2.3.3.1 Non-Competition. You will always win when you compete against nothing. A disruptive technology never competes against a reigning sustaining technology right off the bat. Instead, it starts by surveying for any unidentified or neglected performance demand that is often located beneath the low-end trajectory (see Figure 3). Competing beneath the low-end market essentially means competing against nothing. In other words, you create a new market.

Any disruptive technology will subsequently become sustaining in order to better service a newly identified performance demand. However, the initial period of non-competition is so vital that it prevents a simple and inferior technology from early elimination from market competition. In 1976, Steve Wozniak and Steve Jobs launched Apple I, “a simple design housed in a wooden box” (Anderson, Ferro, and Hilton 2010, 23), which was a vastly inferior product to corporate IBM mainframes and DEC minicomputers in terms of raw computing performance. However, it was ideal for computing hobbyists because there was nothing else in the market to satisfy a tacit demand: *playing with a computing machine at home*. Today, Apple Inc. has

become what it is while DEC was sold to Compaq in 1998 with IBM claiming only 3 percent of its revenue from mainframes in 2010 (Ante 2010).

Non-competition as a DI principle bears noticeable relevance to higher education in the United States. Unidentified and/or neglected "performance demands" largely exist in the form of underserved higher education populations, including but not limited to low-SES students, ethnic minorities, dropouts, non-traditional students, distance learners, and undocumented students (Perez 2010). This principle is also uniquely relevant to LACs as many are exploring a more vocationally-responsive model to adapt to the change of their traditional liberal-arts-intensive "performance demands" (Breneman 1990, Baker, Baldwin, and Makker 2012).

In both cases, MOOCs came in to become something better than nothing (Scholz 2013). However, immediate competition among MOOC providers has already jeopardized its disruptive potential, and hence its long-term impact upon traditional higher education.

2.3.3.2 Job-to-be-done. Though technologically simpler and inferior, a disruptive technology must satisfy the newly identified performance demand. In other words, it must *get the job done*.

Christensen (1997) popularized the term, *jobs-to-be-done*, when he found that innovators tend to focus more on adding technological features than on helping people complete their particular jobs. The jobs-to-be-done principle advises the opposite. In illustration, the famous milkshake marketing story tells of a fast-food restaurant chain improving its milkshake sales by simply thickening it, as the job of many people buying a milkshake in the morning was identified to be *beating the boredom of commuting by having something to do in a free hand* (Christensen and Horn 2008). A drink of extended longevity, the thickened milkshake became a "disruptive technology" to other milkshakes because it serves a different job than *having a drink with good taste* and helps people feel less bored over a long morning commute.

With completion rates usually below 13 percent (Onah, Sinclair, and Boyatt 2014, 5825), it is unclear as to the jobs of those who chose to complete a MOOC as well as those who didn't. They can be much more nuanced than *being able to learn according to personal interests* or *acquiring certification*, but a disruptive technology must identify and help complete those jobs anyhow. MOOCs are falling short in that respect despite holding high potential for learning analytics and data mining (Chu 2013, Mackay 2013) which, however, are not the learners' jobs.

Neither MOOCs nor LACs seem to be serving the exact jobs of those attending LACs. College-bound high school graduates and their parents traditionally have little to no idea about what a liberal arts education is (Barker 2000, Roche 2010). And given only one-third of parents and a quarter of high school students and university graduates who viewed liberal arts positively in 1997 as well as growing disaffection with LACs from that point forward (Hersh 1997), it will be highly interesting to learn of the contemporary jobs of those enrolled as well as prospective LAC students.

2.3.3.3 Unbundling. As much as morning commuters enjoy a lasting milkshake, a little bit of taste never hurts. However, keeping with the *job* rather than going all out for *frills* often tells a disruptive technology from something else. In other words, any disruptive technology must be an unbundled product.

Unfortunately, it is impossible to "unbundle" the taste from a morning commuter's milkshake, which leaves realistic unbundling down to shifting a disruptive technology's proportional dedication in favor of the job rather than frills. The lone fact that the blue solid line in Figure 3 displays a triumphantly steeper trajectory than the red can be explained by one joke of an example: Over time a mechanical watch does the job of *timekeeping* better than a smartphone because it has much less to do than the latter. In a serious matter, a do-less-with-

more disruptive technology will always beat out a do-more-with-more sustaining technology over time on a given job.

Higher education in the United States was not unfamiliar with unbundling before the emergence of MOOCs. The term was introduced as early as the mid-1970s by a law professor regarding illegal bundling practices in higher education back then (Wang 1981). The idea was then applied to community colleges when William E. Troutt (1979) advocated a breakdown of faculty instructional time into direct instruction, assessment of student learning, and academic advising. More recent practices include outsourcing teaching and production obligations to adjunct faculty and external course material vendors (Paulson 2002) as well as redesigning the separate roles of teaching, research, and service for an otherwise "complete" scholar (Presidential Innovation Lab 2014).

Despite a plethora of efforts, much fewer was associated with one particular job that can be done *only* and *no better* than by a higher education institution. It is next to absurd when a student begrudges the money spent on flying tuition and has never wondered what each of his/her penny is paying for. It *is* absurd that at the end of the day the same student will smile over the graduation certificate with his/her job pretty much untouched.

LACs are in the same boat, only with more unturned stones. Particularly, how "liberal arts" are currently bundled by LACs? Are they bundled in a way that helps students complete their jobs? What can be unbundled? Are LACs doing more with more by serving different jobs at the same time? We need to find out.

2.3.4 The way forward

The proliferation of new technologies and delivery models in American higher education is no longer a novelty. What is begging for deliberation instead is a vision beyond phenomena and examples into the driving force that is behind all these things. The theory of disruptive innovation is responsible for many Cinderella type of business successes due to its relentless focus on high-impact practices. However, its contextualization in higher education is still very raw and there is much to be drawn from higher education insiders and subsectors (e.g., independent liberal arts college) in order to give due credit to higher education as a very unique sector. So far, clear illustrations have been made to explicate four points:

1. Technology is essentially different from innovation, albeit instrumental;
2. A technology is disruptive only when it facilitates application of three DI principles;
3. MOOCs represent a still flawed attempt at DI in higher education; and
4. DI as a theory can be instrumental to the transformation of higher education in general and LACs in particular.

Figure 4. Hypothetical framework of DI in higher education/LACs.

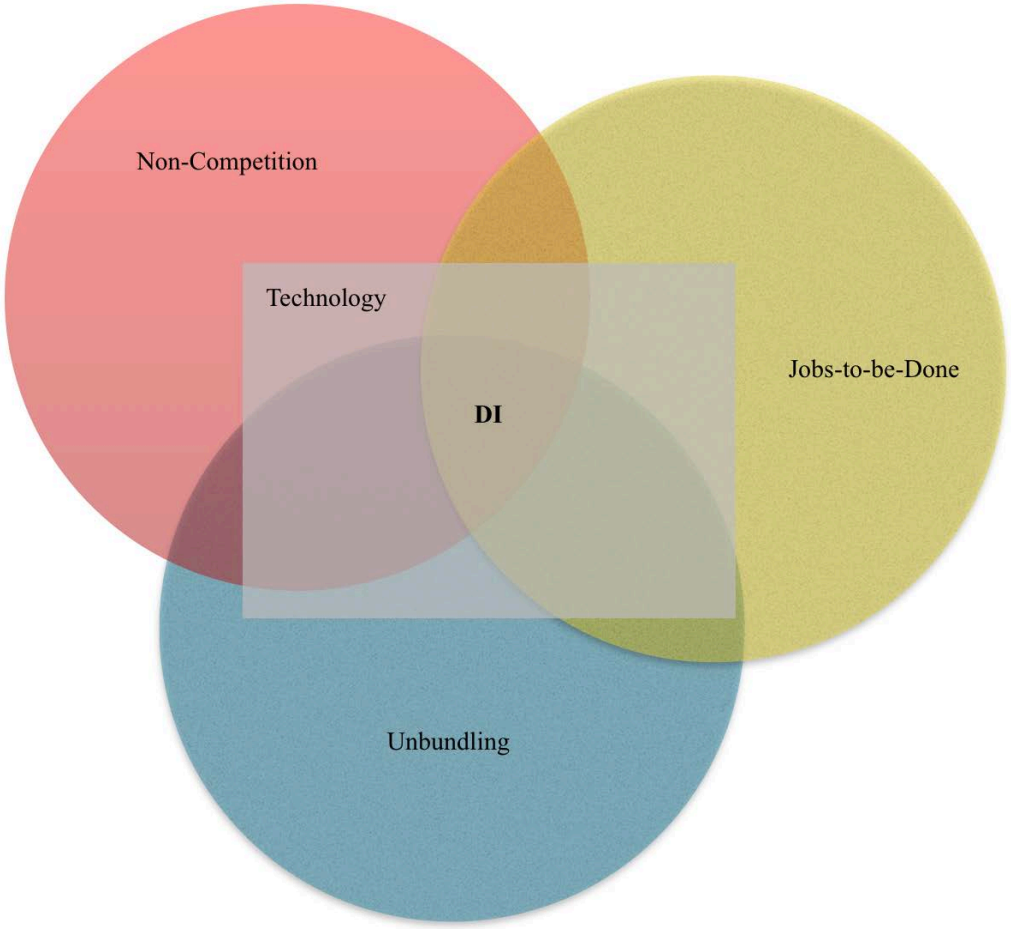


Figure 4 outlines the dynamic of essential DI ingredients as well as a guiding framework for subsequent research design in order to find out how DI may or may not facilitate the transformation of American LACs. The sole purpose is to identify the *boundaries* as well as *a realistic model* of DI in the context of American LACs (illustrated by the all-overlapped area in Figure 4).

When reflecting upon Jeffrey J. Selingo's *College (Un)bound: The Future of Higher Education and What It Means for Students*, Daniel Luzer (2013) beckoned to the greatest inventions in the history of American higher education and said that:

> The best American innovations in education were the Land-Grant College Act of 1862, which helped create a system of public universities, and the GI Bill of 1944, which ensured that an entire generation had the money to attend college… The question is whether or not we will continue this trend or simply give up and say that a few online classes and specialized training are good enough for the majority of Americans. (par. 14)

The answer is a firm *yes*. We will continue this trend and now is the time.

3.0 RESEARCH DESIGN

This chapter explains the research design which can be divided into following six sections: (1) guiding theory and methodology, (2) participants and participating institutions, (3) population and sampling, (4) instrument, (5) institutional review board approval, and (6) data analysis overview. Careful illustrations are provided for each section to ensure maximum validity and reliability of the approach.

3.1 GUIDING THEORY AND METHODOLOGY

By definition, Clayton Christensen's classic disruptive innovation theory suggests that a *disruptive innovation* is a simpler and cheaper solution for customers that, by virtue of technological advancement and following the marketing principles of *non-competition*, *job-to-be-done*, and *unbundling*, emerges to challenge an existing solution that is more complex and expensive. Disruptive innovation is antithetical to *sustaining innovation* which brings about steady and incremental change. Massive Open Online Course (MOOC) is an example of disruptive innovation in higher education. The growing relevance of this theory in the social sector (Eggers et al. 2012) and especially in higher education (Flavin 2012, Flynn 2013) places it as a guiding theory for the design of this research. This study approached the theory by focusing

on the practical implications of its three principles on contemporary challenges and opportunities of U.S. liberal arts colleges.

The literature revealed that many adaptation efforts are subject to a volatile understanding of disruptive innovation in the context of higher education. While studies on technological enablers such as online education (Meyer 2011) or new business models like professional doctorate programs (Robinson et al. 2016) are all contributive, few provides a holistic view on how DI's core concepts of non-competition, job-to-be-done, and unbundling are perceived and strategized. This dissertation focused on these three core concepts.

Some higher education institutions created subsidized and semi-autonomous programs in order to initiate disruptive change (Powell, Olivier, and Yuan 2015). This approach, however, complicates the ecosystem of disruptive innovation to the effect that the results become foreseeable and preventable. Consequently, such efforts are susceptible to premature confluence with sustaining innovation advanced by the institutions.

It is at the institutional level that disruptive innovation becomes more genuine and powerful. Community colleges offer simpler and cheaper higher education to those who are traditionally non-consumers and those who are underserved (Bleed 2007). In that sense, community colleges disrupt other higher education institutions that traditionally neglect these needs but are now forced to react accordingly. MOOCs and for-profit universities are other examples of disruptive innovation in higher education. However, former studies are predominantly quantitative and are often from an outsider's perspective. It is important to fill the void by exploring an insider's perspective as to how disruptive innovation is conceptualized and strategized by people working within an institution.

It is also important to note that disruptive innovation has been studied less in terms of specific higher education institutions. Disruptive innovation may have different impact upon different institutions that may perceive and approach disruptive innovation in a different light. The independent liberal arts colleges as a subsector of American higher education allows the theory of disruptive innovation to be explored on a deeper level.

3.2 PARTICIPANTS AND PARTICIPATING INSTITUTIONS

Former Harvard President Derek C. Bok (Bok 2006) concurred with Abraham Flexner that "the [American] college is without clear-cut notions of what a liberal education is and how it is to be secured… and the pity of it is that this is not a local or special disability, but a paralysis affecting every college in America" (Flexner 1908, 7). While defining liberal arts education is not exactly the goal of this inquiry, it is helpful to be focused on a select number of higher education institutions for the purpose of this study.

This study drew upon the latest 2015 version of the Carnegie Classification of Institutions of Higher Education to determine its population and sampling strategy. It focused upon the Basic Classification of "Baccalaureate Colleges", defined as institutions where bachelor's degrees represent at least 50 percent of all degrees awarded with fewer than 50 master's degrees being awarded per year. By February 2016, there were 583 baccalaureate colleges in the United States, a 13 percent of the total 4,664 higher education institutions in the country. These institutions also enrolled some 999,834 students, a 5 percent of the total national higher education enrollment by the fall of 2014.

Of the two subgroups of "Baccalaureate Colleges", the 254 "Arts and Sciences Focus" institutions provide at least 50 percent of their bachelor's degrees in arts and sciences fields, compared with less than 50 percent by "Diverse Fields" institutions. This is the rationale for selecting the "Arts and Sciences Focus" baccalaureate colleges as the participating institutions for this study.

Table 2. Rationale for selecting participating institutions.

	Selection Rationale		
Baccalaureate Colleges	At least 50% bachelor's degrees	Arts and Sciences Focus	At least 50% arts and sciences majors
		Diverse Fields	Less than 50% arts and sciences majors
Other Colleges	Less than 50% bachelor's degrees		

The study then excluded institutions with significantly distracting attributes. In particular,

- Twenty-seven public institutions were excluded due to potential complications as a result of this control status;
- One private for-profit institution was excluded due to its extremely small number; and
- One private not-for-profit institution was excluded due to closure.

After calculations, that left the total number of participating institutions to 225. Given that the theory of disruptive innovation originated from the business sector and is tech-savvy, this study invited chief administrators of three college divisions, i.e., the equivalents of chief academic officer, chief information officer, and chief financial officer, in order to study how disruptive innovation might have impacted upon the 225 institutions as a whole and individually. The total number of individual participants was 675 (225*3) at maximum.

The 675 participating individuals were contacted via email to respond to an online survey. The researcher then selected 20 participating individuals across the three administrative

groups to inform the inquiry from an in-depth qualitative perspective. Selection of the interview participants was contingent upon the responses to the online survey in order to maximize significant qualitative input from the participants.

3.3 INSTRUMENT

Two instruments were designed to help answer the three research questions from both qualitative and quantitative perspectives. Between the two, a 9-question online survey (see Appendix A) was developed using Qualtrics online survey software and was distributed to the chief academic officer, chief information officer, or chief financial officer of the 225 participating institutions. A maximum of 675 responses helped reveal the senior administrators' variant perceptions about disruptive innovation from a quantitative perspective. On the other hand, a 14-item interview questionnaire (see Appendix B) was administered with 20 participants selected across the three administrative groups. Selection of the interview participants was contingent upon the responses to the online survey in order to maximize significant qualitative input from the participants. Telephone or Skype interviews were conducted with selected participants. Selection of the participants was based upon two criteria. First, participants were shortlisted as potential interviewees according to their responses to the survey question on whether s/he is willing to participate in a follow-up interview. Second, on top of the first criterion, participants were also shortlisted according to their responses to the survey question on whether s/he is aware of a distinct model of disruptive innovation at his/her institution. Following this recruitment method, the first 20 participants confirming interest in an interview were arranged for a 15-45 min structured interview. The 20 interviewees also turned out to be evenly distributed across the three

administrative groups, which is helpful to adopting a comparative perspective. Two questions were added to the end of the 14-item interview to help open up the discussion once the desired information was obtained through the first 12 structured questions. Question 13 asks participants to share whatever is not already covered in the first 12 questions; Question 14 asks participants to "snowball" other experts on this topic for the purpose of future research. Interview data were recorded, transcribed, translated, cleaned, and stored on a Box account accessible only to the researcher. The data were later imported into NVivo 11 which is instrumental to categorizing and determining prominent themes to be presented in the data analysis section.

It is a rationale that any participant falls into one of two situations: 1. The participant knows well about disruptive innovation; and 2. The participant knows little to nothing about disruptive innovation. Participants from the first category are ideal informants about disruptive innovation in American independent liberal arts colleges. However, participants from the second category can still offer valuable viewpoints and institutional information that contribute to the understanding about disruptive innovation from a liberal arts perspective. An overview of the instruments' question layout along with the rationale is provided below (Table 3).

Table 3. Outline of research methodology.

General Outline			
Things to Explore	General awareness of disruptive innovation	Contextualized understanding using the three principles of disruptive innovation	Association between institutional innovation and technological enablers
Data Source	Survey Qs: 2, 7; Interview Qs: 3-6, 13	Survey Qs: 3-6 Interview Qs: 7-11	Survey Qs: 2-7 Interview Qs: 1-2, 6, 12
Emerging Data	Level of awareness; Institutional initiatives; and Opinions toward the initiatives	Non-competition domains; Need-provision gaps; and High-impact & low-impact factors	Institutional innovation frameworks; New technologies; Innovative approaches to the association; and Administrative feedback

Table 3 continued

Relevance	Helps assess the contextual entry of disruptive innovation	Helps assess the consistency and evolution of disruptive innovation principles in the new context	Helps assess institutional responses to the new entry
Plan for Analysis	Compare the levels of awareness across three administrative groups	Compare Clayton Christensen's classic disruptive innovation principles with understandings in the new context	Compare Clayton Christensen's classic disruptive innovation cases with ones in the new context
Key Literature	Behara and Davis (2015) Powell et al. (2015) Robinson et al. (2016) Yuskauskas (2015)	Ahmad (2015) Eggers et al. (2012) Flavin (2012) Weise (2014)	Blumenstyk (2012) Mukerjee (2014) Yu and Hang (2011)

3.4 ETHICAL CONCERNS OF RESEARCH DESIGN

This research incurred minimal to no risk to participating institutions and individuals. Participating individuals were asked to share personal opinions as well as institutional facts that contribute to the understanding of how disruptive innovation is received and practiced by contemporary American independent liberal arts colleges. This study did not delve into private or sensitive domains of the participating individuals. The selected administrative units were non-sensitive departments and the individuals were professional heads of their respective units. Informed consent was sought after through standardized invitation emails that introduce participating individuals to the study background as well as the instruments. No monetary reward was utilized in this study. The data was collected and recorded solely by the author. Best efforts were made to ensure full compliance with the University of Pittsburgh Institutional Review Board regulations as well as codes of conduct that are widely recognized by the community of survey researchers.

3.5 RATIONALE OF DATA COLLECTION METHODS

Adopting a survey method to data collection fills a gap in the methodology commonly applied to independent liberal arts colleges. Independent liberal arts colleges are given less attention than other higher education institutions in the United States. Among the studies that exist, statistical reports and short essays are more common than full-scale empirical studies that are change-driven. As a result, these studies were taken either too collectively at the expense of diversity or too individually to bring sizeable impact. What is missing in between is a method capable of deducing commonalities as well as acknowledging the huge diversity of the American independent liberal arts colleges.

It is also important to understand that the theory of disruptive innovation has only recently become salient to higher education. While MOOCs have taken a front seat in this discourse, much less has been studied about other examples and especially adapting the theory to a certain higher education context. A fine line should be drawn between examples and theory of which the latter must be contextualized. Therefore, a descriptive approach based upon survey methodologies is ideal.

This approach also helped digest the concept of disruptive innovation. Disruptive innovation is a compact notion that does not enlighten if not broken down into more intelligible parts. Even though one may not have heard of it, many are already subject to its impact in their lives, i.e., non-competition, job-to-be-done, and unbundling. Such is the case in higher education as well. An independent liberal arts college may be practicing upon one, two, or all of the three principles despite having never participated in MOOCs. For those that do participate in MOOCs, chances are that there is more happening on the institutional level than merely adopting a delivery model. The principles must also be broken down in order to be assessed at various

levels of institutional operation. Numbers help facilitate this inquiry, but not as much as first allowing the insiders speak about what they know that may actually reflect the principles of disruptive innovation.

3.6 DATA ANALYSIS

This study used descriptive statistics methods and the emergent theory to analyze the quantitative and qualitative contingent of the data. The descriptive statistics methods are effective in portraying the variant perceptions of disruptive innovation across the three groups of LAC senior administrators. The emergent theory, as a product of grounded theory, is widely adopted to organization studies to generate abstract significant categories from data without drawing upon specific theoretical knowledge in the first place (Human 2008). The theory is effective in generating categories and thematic understandings from the perspective of disruptive innovation on contemporary issues of independent liberal arts colleges in the United States.

The qualitative data was digitally recorded, transcribed, cleaned, coded, and analyzed using NVivo qualitative analysis software. A unique code was used to ensure confidentiality as well as to help locate the source of the interview data. The unique code begins with capitalized letters “LAC” which is immediately followed by a double-digit number indicating a certain interviewee who has participated in this study. Another double-digit number follows after a hyphen to indicate a certain item in the interview questionnaire. As an example, the unique code “LAC01-01” helps navigate to the first interviewee as well as the data collected from Question 1.

The analysis aimed at identifying conceptual awareness of disruptive innovation by key administrators of the selected American independent liberal arts colleges. The analysis also

aimed at discovering institutional practices that reflect part or all of the three principles of disruptive innovation. It also compared the data collected from the three administrative groups, i.e., chief academic officers, chief information officers, and chief financial officers. Focus was placed upon each group as well as across them to determine similarities and differences of the participants' conceptualization and observation of disruptive innovation.

The analysis helped describe the aggregate conceptual awareness of disruptive innovation by key administrators from the participating institutions. Each participant's responses constituted a dataset. There was a maximum of 675 (225*3) datasets across the three administrator groups. After factoring in response rate and data quality, the number may become lower. The analysis also factored in bias due to potentially uneven numbers of datasets received from the three groups. If the majority of high-quality datasets are from one particular group, the findings are attributed to that group instead of to all.

The analysis aimed at generating findings in three key domains: 1. General awareness of disruptive innovation, 2. Contextualized understanding of the three principles of disruptive innovation, and 3. Association between institutional innovation and technological enablers (see Table 3). To explore the first domain, the analysis compared the levels of awareness across the three administrative groups. To explore the second domain, the analysis compared Clayton Christensen's classic disruptive innovation theory with contextualized understandings from American independent liberal arts colleges. To explore the third domain, the analysis compared Clayton Christensen's classic disruptive innovation cases with contextualized cases from American independent liberal arts colleges. The analysis also compared the three groups to determine different levels of conceptualization and perceptions of disruptive innovation across the administrative functions.

3.7 CONCLUSION

That the notion of disruptive innovation originated from the business sector does not forbid its entry to the social sector and eventually higher education. From a methodological perspective, it is more reasonable to concentrate first upon the business-savvy departments in a higher education institution, which is why finance and information technology are selected as frontline units for this study along with academic affairs.

This selection also allows similarities and differences to be examined across different administrative departments in terms of how disruptive innovation is perceived and conceptualized. While it might be more plausible to assume positive and constructive responses to disruptive innovation by business- and tech-savvy departments, there could be a lot more to it than what we believe right now.

Implementing this methodology helped portray two realities: 1. perception of disruptive innovation as a practical existence in American independent liberal arts colleges, and 2. conceptualization of disruptive innovation in the context of American independent liberal arts colleges. American independent liberal arts colleges and disruptive innovation are not inherently built for each other. However, the former presents an excellent test for the latter's tentative agenda in higher education. Meanwhile, the latter may provide the business acumen to the former to make them more successful and sustainable. In that sense, they might just be for each other.

4.0 DATA ANALYSIS

4.1 RESULTS OF DATA COLLECTION

A total of 225 LACs have been invited to participate in the online survey during the time period of Sept. 27th – Nov. 8th, 2016. While ideally there should be 675 (225*3) individual participants in total, the actual number is reduced to 576 due to issues of contact accessibility or change of employment status. Of the 576 accessible individual participants, 146 participated in the survey, with 128 responses having been recorded and 18 still in "In Progress" status at the time of this defense. Of the 128 recorded responses, 105 are complete and 23 are partially complete. It is the author's intention to include the partially complete responses in data analysis with due discretion.

Of the 105 complete responses, 44, 31, and 30 were respectively from CAOs, CIOs, and CFOs or their equivalents. Each administrative group has one anonymous participant. Of the 23 partially complete responses, 5, 7, and 11 were respectively from CAOs, CIOs, and anonymous participants. The table below summarizes the overall statistical results of data collection.

Table 4. Summary of individual participants and participating LACs.

Individual Participants	***Accessible N***	***Participation N/%***
Chief Academic Officer or Equivalent	207	49/23.7
Chief Information Officer or Equivalent	181	38/20.1
Chief Financial Officer or Equivalent	188	30/16
Anonymous Participants	NA	11/NA
Total Participants	576	128/22.2
Total LACs	225	97/43.1

4.1.1 Participating LACs in the online survey

Of the 225 LACs, 97 participated in the survey with recorded responses, which constitutes a response rate of 43.1 percent. 86 of the recorded responses are complete. 17 LACs have more than one individual participants. A complete list of participating LACs along with their location information is provided below:

Table 5. Participating LACs and their geographic locations.

LAC	*Location*	*LAC (Cont'd)*	*Location (Cont'd)*
Agnes Scott College	Decatur, Georgia	Lake Forest College	Lake Forest, Illinois
Albion College	Albion, Michigan	Lewis & Clark College	Portland, Oregon
Albright College	Reading, Pennsylvania	Linfield College	McMinnville, Oregon
Amherst College	Amherst, Massachusetts	Luther College	Decorah, Iowa
Antioch University-Santa Barbara	Santa Barbara, California	Lycoming College	Williamsport, Pennsylvania
Arcadia University	Glenside, Pennsylvania	Lyon College	Batesville, Arkansas
Assumption College	Worcester, Massachusetts	Meredith College	Raleigh, North Carolina
Augustana College	Rock Island, Illinois	Monmouth College	Monmouth, Illinois
Barnard College	New York, New York	Moravian College	Bethlehem, Pennsylvania
Bates College	Lewiston, Maine	Mount Holyoke College	South Hadley, Massachusetts
Bennington College	Bennington, Vermont	Oberlin College	Oberlin, Ohio
Bowdoin College	Brunswick, Maine	Occidental College	Los Angeles, California
Bucknell University	Lewisburg, Pennsylvania	Ohio Wesleyan University	Delaware, Ohio
Carthage College	Kenosha, Wisconsin	Pacific Union College	Angwin, California
Central College	Pella, Iowa	Pine Manor College	Chestnut Hill, Massachusetts
Claflin University	Orangeburg, South Carolina	Pitzer College	Claremont, California
Coe College	Cedar Rapids, Iowa	Randolph College	Lynchburg, Virginia
Colby College	Waterville, Maine	Reed College	Portland, Oregon
College of Saint Benedict	Saint Joseph, Minnesota	Ripon College	Ripon, Wisconsin
College of the Holy Cross	Worcester, Massachusetts	Saint Anselm College	Manchester, New Hampshire
Concordia College at Moorhead	Moorhead, Minnesota	Saint Michael's College	Colchester, Vermont
Connecticut College	New London, Connecticut	Sewanee-The University of the South	Sewanee, Tennessee
Cornell College	Mount Vernon, Iowa	Shimer College	Chicago, Illinois
Covenant College	Lookout Mountain, Georgia	Siena College	Loudonville, New York
Davidson College	Davidson, North Carolina	Skidmore College	Saratoga Springs, New York
DePauw University	Greencastle, Indiana	Smith College	Northampton, Massachusetts
Earlham College	Richmond, Indiana	Southern Virginia University	Buena Vista, Virginia
Eckerd College	Saint Petersburg, Florida	Spring Hill College	Mobile, Alabama
Elmira College	Elmira, New York	St. Olaf College	Northfield, Minnesota
Emory and Henry College	Emory, Virginia	Sterling College	Craftsbury Common, Vermont
Franklin and Marshall College	Lancaster, Pennsylvania	Stillman College	Tuscaloosa, Alabama
Georgetown College	Georgetown, Kentucky	Stonehill College	Easton, Massachusetts
Gettysburg College	Gettysburg, Pennsylvania	Susquehanna University	Selinsgrove, Pennsylvania
Gordon College	Wenham, Massachusetts	Swarthmore College	Swarthmore, Pennsylvania
Goucher College	Baltimore, Maryland	Sweet Briar College	Sweet Briar, Virginia

Table 5 continued

Grinnell College	Grinnell, Iowa	Thiel College	Greenville, Pennsylvania
Guilford College	Greensboro, North Carolina	Union College	Schenectady, New York
Hamilton College	Clinton, New York	Warren Wilson College	Swannanoa, North Carolina
Hanover College	Hanover, Indiana	Washington & Jefferson College	Washington, Pennsylvania
Hartwick College	Oneonta, New York	Washington and Lee University	Lexington, Virginia
Harvey Mudd College	Claremont, California	Westminster College	New Wilmington, Pennsylvania
Haverford College	Haverford, Pennsylvania	Westminster College	Fulton, Missouri
Hiram College	Hiram, Ohio	Westmont College	Santa Barbara, California
Hobart William Smith Colleges	Geneva, New York	Wheaton College	Norton, Massachusetts
Illinois Wesleyan University	Bloomington, Illinois	William Jewell College	Liberty, Missouri
John Carroll University	University Heights, Ohio	Williams College	Williamstown, Massachusetts
Judson College	Marion, Alabama	Wofford College	Spartanburg, South Carolina
Juniata College	Huntingdon, Pennsylvania	Young Harris College	Young Harris, Georgia
Kenyon College	Gambier, Ohio		

The 97 participating LACs come from 27 out of the 50 states. Pennsylvania, Massachusetts, and New York are the top three states with the highest numbers of participating LACs. Below is a full summary of geographical distribution of the participating LACs.

Table 6. Distribution of participating LACs across states.

State	***N of Participating LACs***	***State (Cont'd)***	***N of Participating LACs (Cont'd)***
Pennsylvania	14	Oregon	3
Massachusetts	10	Vermont	3
New York	8	Missouri	2
California	6	South Carolina	2
Illinois	5	Wisconsin	2
Iowa	5	Arkansas	1
Ohio	5	Connecticut	1
Virginia	5	Florida	1
North Carolina	4	Kentucky	1
Alabama	3	Maryland	1
Georgia	3	Michigan	1
Indiana	3	New Hampshire	1
Maine	3	Tennessee	1
Minnesota	3		

4.1.2 Individual participants in the online survey

Of the 576 accessible individual participants, 207, 181, and 188 are respectively CAOs, CIOs, and CFOs or their equivalents of the participating LACs. The 128 recorded survey responses are divided into 49, 38, and 30 across the three groups besides 11 anonymous responses. In summary, 23.7, 20.1, and 16.0 percent of the accessible CAOs, CIOs, and CFOs completed the online survey. The total response rate of the individual participants is 22.2 percent.

4.1.3 Individual participants in the follow-up interview

Participants of the follow-up interview were recruited through two channels: expressed interest in participation and survey responses that warrant further inquiry. Of the 128 survey participants with recorded responses, 28 expressed interest in participation and 20 follow-up interviews were conducted. The 20 interviewees represented 19 LACs from 13 states. 6 CAOs, 9 CIOs, and 5 CFOs participated in the follow-up interview. Below is a full summary of interview participation.

Table 7. Individual participants in the follow-up interview.

State	***LAC***	***Participant's Title***
California	Antioch University-Santa Barbara	CAO
	Occidental College	CAO
	Pitzer College	CAO
Connecticut	Connecticut College	CIO
Indiana	DePauw University	CIO
	Earlham College	CFO
Iowa	Grinnell College	CFO
Kentucky	Georgetown College	CAO
Massachusetts	Stonehill College	CAO
		CIO
Missouri	Westminster College	CAO
New Hampshire	Saint Anselm College	CIO

Table 7 continued

New York	Hartwick College	CFO
North Carolina	Davidson College	CIO
Ohio	Kenyon College	CIO
	Ohio Wesleyan University	CIO
	Haverford College	CFO
Pennsylvania	Lycoming College	CIO
	Moravian College	CIO
Vermont	Sterling College	CFO

The 19 institutions constituted a robust sample of the private not-for-profit LACs in the U.S. with equal measure of similarity and diversity. While similarity is essential to forming a common ground for analysis, institutional diversity, often so rich in LACs, provides a crucial lens for exploring innovative and even disruptive practices for preserving and reshaping values of an institution. A table is presented below to summarize some immediate similarities that characterize this sample in comparison with two dummy institutions of which one is a top LAC (Williams College), the other a top research university (Princeton University).

Table 8. Profiles of the 19 participating LACs in the follow-up interview.

Institution	***Year Founded***	***National LAC Ranking***	***Enrollment***	***Student to Faculty Ratio***	***Avg. Class Size/ % under 20***	***Total Annual Cost ($)***
Princeton University	1746	NA	8,138	5:1	NA/70.4	60,090
Williams College	1793	1	2153	7:1	NA/77.9	65,480
Davidson College	1837	9	1,784	10:1	15/73	61,923
Haverford College	1833	12	1233	9:1	NA/70.7	66,490
Grinnell College	1968	19	1705	9:1	NA/69.2	60,738
Kenyon College	1824	27	1711	10:1	17/67.9	63,330
Pitzer College	1963	32	1067	10:1	15/72.7	63,870
Occidental College	1887	44	2114	10:1	19/63.8	65,530
Connecticut College	1911	50	1,922	9:1	18/69.9	65,000
DePauw University	1874	53	2,265	10:1	13/71.6	58,608
Sterling College	1887	56	704	14:1	12/NA	31,466
Earlham College	1847	68	1,067	9:1	13.5/79.3	54,870
Ohio Wesleyan University	1842	95	1675	10:1	17/71.8	55,860
Stonehill College	1948	108	2494	12:1	19/49.2	55,030
Saint Anselm College	1889	115	1927	11:1	NA/67.6	52,560
Westminster College	1851	149	940	14:1	NA/68.3	34,020
Lycoming College	1812	154	1289	13:1	NA/65.3	48,580
Hartwick College	1797	159	1392	10:1	16/71.2	54,370
Moravian College	1742	159	2261	12:1	16.7/61.2	52,377
Georgetown College	1829	168	1,364	10:1	NA/76.9	44,900

Table 8 continued

Antioch University-Santa Barbara	1977	Unranked	450	11:1	20/NA	18,639

This table indicates a full spectrum of similarities and diversity of the 19 LACs, with reference to the top-ranked national university (Princeton University) and liberal arts college (Williams College) in 2017. Evenly distributed across the ranking spectrum except Antioch University—Santa Barbara, the 19 LACs are similarly characterized by a small enrollment (no higher than 2,500), a low student to faculty ratio (no higher than 14:1), and a small average class size (as low as 12 students per class). The 19 LACs compare less favorably with Williams College in student to faculty ratio and class size. Interestingly, many also compare less favorably with Princeton University which is not an LAC. Also, the 19 LACs charge high tuition and fees commensurate with their rankings and at a level that often exceeds Princeton's. 7 out of the 19 LACs cost more annually than Princeton University, of which the lowest ranked LAC is at 50th nationwide. Finally, the years of establishment for the 19 LACs span vastly across the range of 1742-1977, which allows a broad lens for exploring these 19 distinct cases.

4.2 RESULTS OF DATA ANALYSIS ON THE ONLINE SURVEY

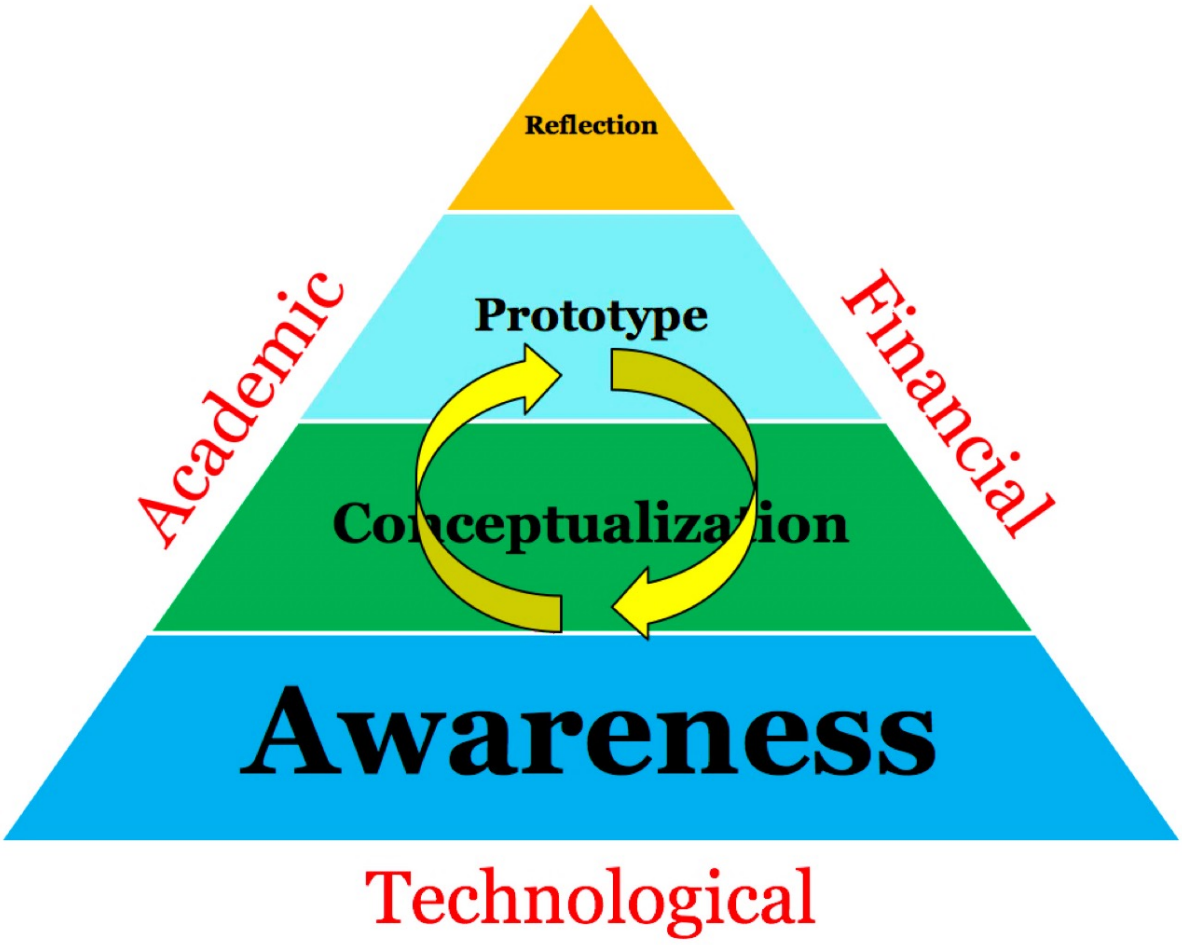
The collected quantitative and qualitative data were analyzed using descriptive statistics and emergent theory respectively to help answer the three research questions:

1. What level of awareness do senior administrators of U.S. liberal arts colleges possess of disruptive innovation?

2. What institutional issues of U.S. liberal arts colleges can be revealed using the framework of disruptive innovation? And
3. What challenges and opportunities exist in applying disruptive innovation to the context of U.S. liberal arts colleges?

The analysis process followed a guiding framework to examine different levels of engagement with disruptive innovation in the LAC context, including awareness, conceptualization, example, and reflection. This framework visualizes the inner logic between the research questions and projects how the concept of DI is contextualized from the perspectives of the senior administrators in charge of academic, technological, and financial affairs in their institutions. These three administrative areas are key to the institutional well-being of an LAC. At the same time, they are ideal for observing interventions of disruptive innovation. According to this framework, examples and reflections on DI are desired findings that are, however, contingent upon how the senior administrators perceive and/or conceptualize disruptive innovation in the first place.

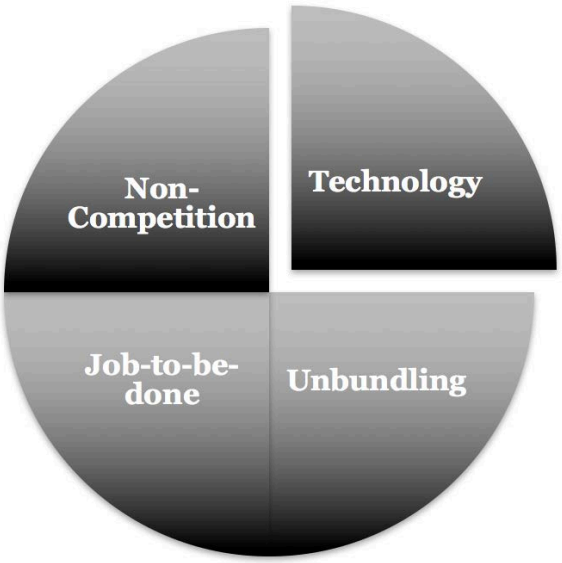
Figure 5. Guiding framework for analyzing DI in the LAC context.



The concept of disruptive innovation is often understood with reference to an actual piece of technology or even more narrowly as *technology* per se such as online learning or MOOC, which is evidenced by a few knee-jerk reactions from the interview participants. DI examples or utilization of these technologies, while being disruptive to higher education to a certain extent, are often under criticism that they are not creating sustained values proportional to the changes made necessary. Aside from improvement of access to higher education, the examples often draw attention to the issue of educational quality, with suspicion that it could be applied indiscriminately to different subsets of higher education, including liberal arts colleges. Liberal arts colleges represent a distinct set of values that serve them well for centuries. It is less likely

that the long-cherished residential model would submit to a certain piece of technology overnight, not any monolithic theory coming from outside the LAC context. In that light, the concept of DI must be broken down to its key components in order to be contextualized. Therefore, what is to be used for analysis in the place of the concept of DI is essentially a 3+1 model (see Figure 6).

Figure 6. 3+1 model of disruptive innovation.



While the classic terms of DI are used in the 3+1 model, they can be easily contextualized and understood as *new value* (for *non-competition*), *new need* (for *job-to-be-done*), and *new model* (for *unbundling*). Clayton Christensen's classic theory of DI overtime has evolved away from being technology-determinant, evidenced by him replacing the term "disruptive technology" with "disruptive innovation". The role of technology is becoming secondary given the new forms of DI, including strategic DI that relies more on strategic planning than on technological advancement. With all considered, the 3+1 model as an analytical framework of DI is ideal for breaking down and contextualizing the monolithic concept into a serviceable tool.

4.2.1 General awareness and conceptualization of disruptive innovation

Following the 4-layer analysis framework, this study first examined awareness of DI on the part of senior administrators from the participating LACs. These administrators are routinely involved in key decision-making and strategic planning processes of their own institutions. Their informed awareness of the concept is crucial as it would predicate the inquiry deeper into the domains of conceptualization, example, and reflection. Such awareness also reflects the state of understanding about key components of disruptive innovation, e.g., new value (or non-competition), that would bear upon the strategic orientation of a liberal arts college. The individual participants, based on their different administrative roles, are expected to respond to the questions related to DI awareness with a certain level of variance. The classic definition of disruptive innovation was introduced to the participants as a working definition, facilitated by examples from the business sector, e.g., Uber. This was conducted in a manner to allow maximum liberty on the part of participants to share their attitudes toward and opinions of the concept.

Table 9. Breakdown of Responses to Survey Question 2.

On a scale of 1 to 5 (1=strongly disagree and 5=strongly agree), how would you rate the following statements?	***1***	***2***	***3***	***4***	***5***	***Total***
a. I am familiar with the concept of disruptive innovation.	8 (7.02%)	4 (3.51%)	12 (10.53%)	42 (36.84%)	48 (42.11%)	114 (100%)
b. I am in favor of disruptive innovation.	1 (0.88%)	13 (11.40%)	53 (46.49%)	36 (31.58%)	11 (9.65%)	114 (100%)
c. Disruptive innovation is relevant to liberal arts colleges in the United States.	3 (2.63%)	8 (7.02%)	35 (30.70%)	51 (44.74%)	17 (14.91%)	114 (100%)
d. Disruptive innovation can work in the context of liberal arts colleges in the United States.	7 (6.14%)	10 (8.77%)	35 (30.70%)	48 (42.11%)	14 (12.28%)	114 (100%)
e. Disruptive innovation is useful to institutional innovation of liberal arts colleges in the United States.	5 (4.42%)	13 (11.50%)	37 (32.74%)	48 (42.48%)	10 (8.85%)	114 (100%)
f. In the United States, liberal arts colleges serve particular needs that are not served by other HEIs, e.g., research universities, community colleges, etc.	4 (3.51%)	2 (1.75%)	4 (3.51%)	27 (23.68%)	77 (67.54%)	114 (100%)
g. The liberal arts college I work for serves particular needs that are not served by other liberal arts colleges in the United States.	3 (2.63%)	23 (20.18%)	37 (32.46%)	28 (24.56%)	23 (20.18%)	114 (100%)

Table 9 continued

h. There are particular needs that are neglected by both liberal arts colleges and other HEIs in the United States.	7 (6.25%)	21 (18.75%)	38 (33.93%)	28 (25.00%)	18 (16.07%)	114 (100%)
i. Technology is increasingly important in advancing the mission of liberal arts colleges in the United States.	4 (3.51%)	3 (2.63%)	15 (13.16%)	52 (45.61%)	40 (35.09%)	114 (100%)
j. Liberal arts education can be successfully delivered by digitized experiences.	12 (10.53%)	25 (21.93%)	35 (30.70%)	29 (25.44%)	13 (11.40%)	114 (100%)
k. Service digitization can be strategically utilized to lower costs for liberal arts colleges in the United States.	8 (7.02%)	25 (21.93%)	32 (28.07%)	34 (29.82%)	15 (13.16%)	114 (100%)

Table 9 summarizes the responses to an 11-item Likert scale question. A total of 114 responses have been recorded. Participants were asked to respond to a statement that either explicitly contains the term *disruptive innovation* or focuses on one of its key components without mentioning the term. Statements that do not contain the term *disruptive innovation* are based on one of the components from the 3+1 DI model. For example, statements f-to-h are based on the component of new value (or non-competition) to examine differences between core values of an LAC, its peers, and other HEIs. Likewise, statements i-to-k are based on the technology component of the 3+1 model to examine important questions related to technology in the LAC context.

Statements a-to-e evaluate basic awareness of the DI concept. The results indicated that a combined 78.95 percent of the participants (those choosing “4” or “5”) are familiar with the concept, with 42.11 percent being very familiar with the concept, which created a solid ground for deeper inquiry. 46.49 percent of the participants indicated that they do not have a positive or negative inclination toward DI. A combined 41.23 percent of the participants (those choosing “4” or “5”) indicated that they have a moderate to strong inclination toward DI, with only a combined 12.28 percent (those choosing “1” or “2”) indicating that they have a negative inclination toward DI. Responses to the first two statements indicated that the senior

administrators have a high general awareness of DI and are more positive than negative toward the concept. Few participants were either unaware of or negative toward DI.

Statements c-to-e evaluate participants' informed awareness based on their opinions on the relevance of DI to the LACs. The participants generally agreed that DI is relevant to the LACs, with a combined 59.65 percent of the participants (those choosing "4" or "5") agreeing upon a moderate to strong relevance. Only a combined 9.65 percent of the participants (those choosing "1" or "2") disagreed moderately or strongly upon the relevance. In addition to relevance, statements d and e evaluate participants' opinions on DI's applicability as well as impact on institutional innovation. A combined 54.39 and 51.33 percent of the participants (those choosing "4" or "5") agreed respectively upon DI's applicability and impact on institutional innovation. Only a combined 14.91 and 15.92 percent (those choosing "1" or "2") disagreed respectively upon these two statements.

Statements f-to-h evaluate participants' opinions on institutional distinctions based on the needs served. According to the non-competition principle in the classic theory of DI, underrepresented needs, when served, facilitate differentiation due to a lack of competition. The data indicate that a combined 91.22 percent of the participants (those choosing "4" or "5") agreed upon the distinctions of LACs in comparison with other HEIs, with a 67.54 percent strongly supporting this statement. A combined 8.77 percent (those choosing "1", "2", or "3") were less certain about whether the LACs are sufficiently distinct from other HEIs based on the needs served. Institutional distinctions may also exist among peer institutions. A combined 44.74 percent of the participants (those choosing "4" or "5") agreed moderately or strongly that their LACs are distinct from peer institutions, with a 32.46 percent uncertain and a combined 22.81 percent (those choosing "1" or "2") disagreeing upon the statement. Despite awareness of strong

distinctions of and among the LACs, the participants were also aware of needs neglected by both LACs and other HEIs. A combined 41.07 percent of the participants (those choosing “4” or “5”) were aware of such needs, compared with only 25 percent who were not.

By focusing on the notions of institutional distinction and need, statements f-to-h focus on two components of the 3+1 DI model in new value (or non-competition) and new need (or job-to-be-done). An LAC becomes distinct from other institutions if it discovers and fulfills needs. In doing so, it creates and delivers values. Two things of note emerge from results: First, participants were less certain about the distinctions of their own LACs than the distinctions between LACs and other HEIs, evidenced by a much higher combined percentage (those choosing “4” or “5”) for statement f (91.22 percent) than for statement g (44.74 percent). It shows that LACs are more different from other HEIs than they are from each other, based on the needs served. Second, there are still hidden and/or unfulfilled needs despite strong distinctions between LACs and other HEIs. A combined 91.22 percent of the participants (those choosing “4” or “5”) agreed that LACs serve needs that are not served by other HEIs. However, a combined 41.07 percent (those choosing “4” or “5”) agreed that there are needs neglected by both. If it takes more than LACs and other HEIs combined to fulfill some of the existing needs, it means that there is room for new values (or non-competition) to be created by fulfilling those needs.

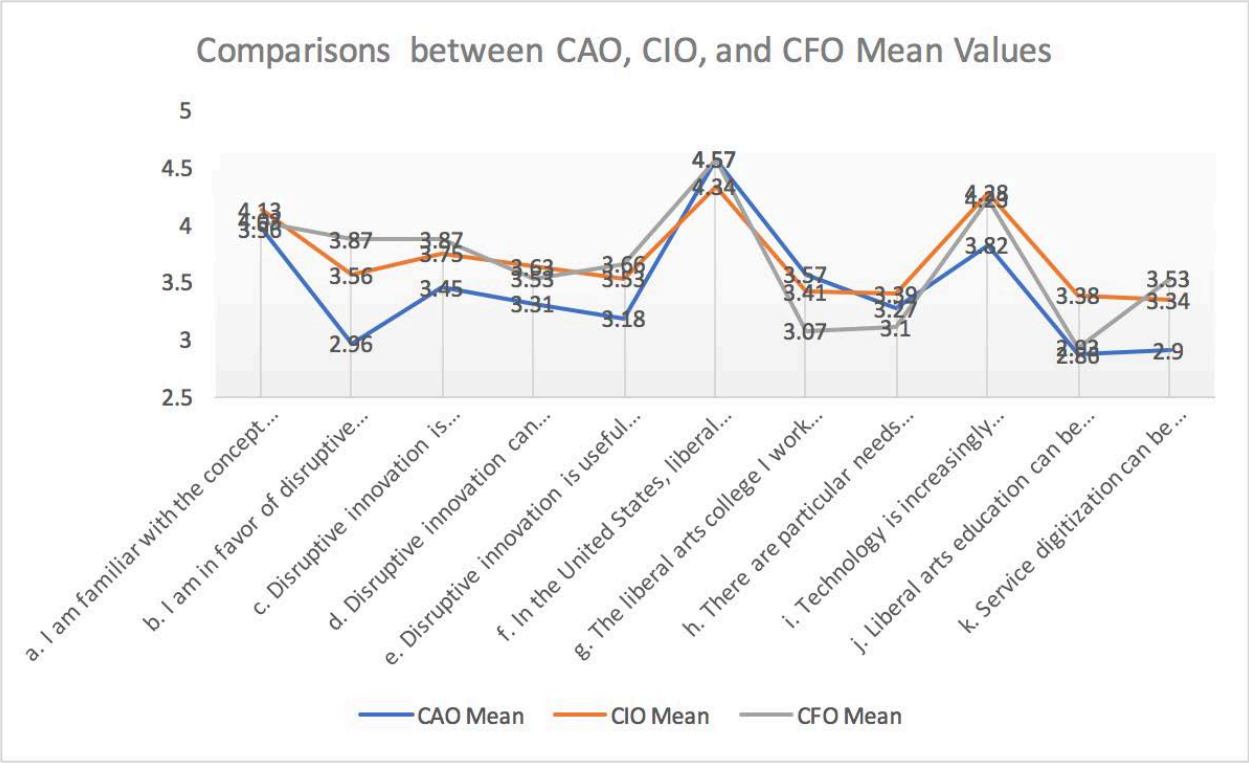
Statements i-to-k evaluate participants’ opinions on the role of technology in the LAC context. A combined 80.70 percent of the participants (those choosing “4” or “5”) agreed upon the growing importance of technology in advancing the mission of LACs, with 35.09 percent strongly supporting this statement. The opinions are evenly divided toward a digitized experience of liberal arts education, with a combined 36.84 percent agreeing and 32.46 percent

disagreeing upon the statement. Finally, more participants (a combined 42.98 percent) agreed that digitizing some of the institutional services can help lower costs for the LACs than those who disagreed (a combined 28.95 percent).

In summary, results from the 11 statements indicate that 1. The participants were highly aware of the DI concept (78.95 percent); and 2. The participants were inclined more toward than against it (41.23 percent vs. 12.28 percent). There is a universal tendency toward agreeing than disagreeing upon the 11 statements, with the smallest margin between agreement and disagreement found at the statement that "liberal arts education can be successfully delivered by digitized experiences", at 4.38 percent. The top three statements with highest percent of strong agreement (those choosing "5") were, in order, statements f (67.54 percent), a (42.11 percent), and i (35.09 percent).

The analysis also evaluated the consistency of opinions among the three administrator groups. Focusing on mean values for each statement, Figure 7 indicates that, despite different administrator groups, all mean values fall within the range of 2.9-4.57, which suggested a tendency to agree on the 11 statements. The three colored lines also take on a similar shape, which suggested that the three administrator groups tended to agree with each other on most of the statements. However, inconsistency existed. First, the CAOs tended to have different opinions on the statements while the CIOs and CFOs were more often in consensus.

Figure 7. Comparisons between CAO, CIO, and CFO mean values on the 11 statements.



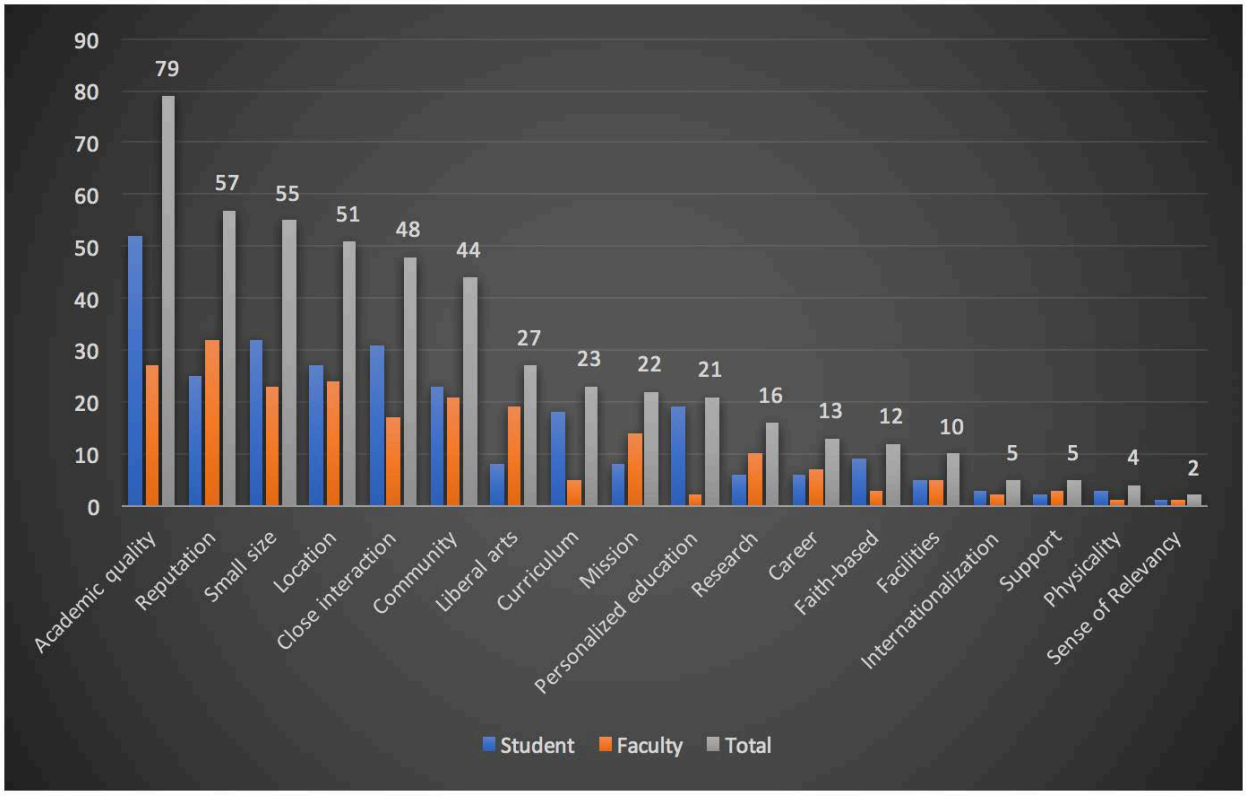
Except statements a and f where the administrator groups were more in consensus, the CAOs were less willing to show agreement upon many statements, including b, c, d, e, i, and k. The technological and financial savviness of CIOs and CFOs seems to help align their opinions on DI while CAOs, who are perhaps less savvy in those two areas, stand out different.

4.2.2 Contextualizing *non-competition* and *job-to-be-done*: Rationales for faculty and students choosing their LACs

Survey Question 3: I believe students/faculty members chose our institution mainly because of _____ (provide up to three reasons with 1 = highest significance and 3 = lowest significance).

Faculty and students are two major stakeholder groups whose needs dictate the operations of a higher education institution. Informed awareness of the needs, trends, and alignment between stakeholder groups is crucial to institutional well-being and instrumental to identifying new needs and values. Question 3 applied the new value (or non-competition) and new need (or job-to-be-done) components of the 3+1 DI model to explore and compare, from the perspective of senior administrators, faculty's and students' rationales for choosing to work/study at their LACs.

Figure 8. Shared themes of the reasons for students and faculty choosing their LACs.



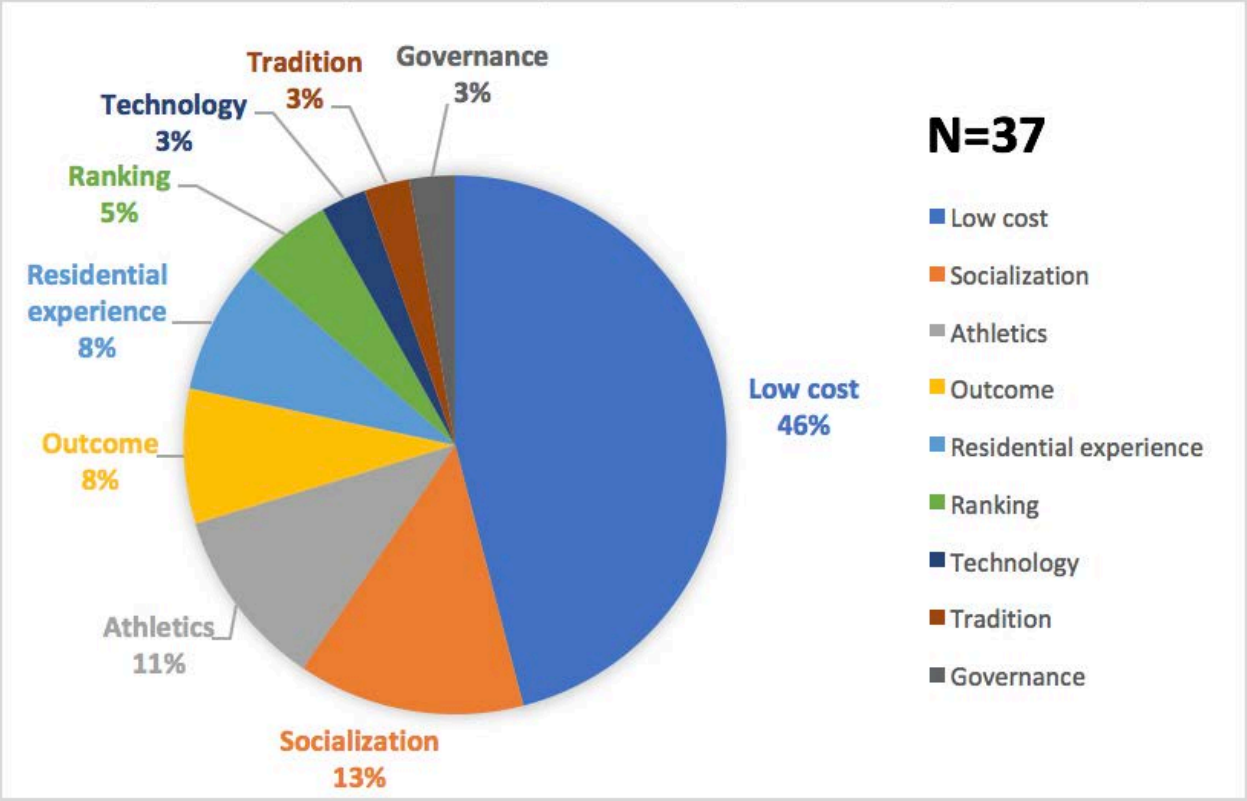
By asking the participants to verbalize up to three reasons for students and faculty choosing their LACs, Question 3 generated a total of 39 themes after coding. Of the 39 themes, 18 are shared by both students and faculty, with the remaining 21 divided between student- and

faculty-only themes. Figure 8 summarizes the 18 shared themes arranged in order from high to low total frequency. For example, *academic quality* was mentioned 79 times (out of a maximum 219) as a reason for students or faculty choosing their LACs. Interestingly, the theme of *liberal arts* is distantly behind *academic quality, reputation, small size, location, close interaction,* and *community*. More than twice as many times (19 versus 8) was *liberal arts* mentioned as a reason for faculty choosing their LACs compared with students. This is interesting because it suggests that the comprehensive notion of *liberal arts* is not readily sought after as its many more tangible aspects, e.g., *small class,* an inclination even more prominent for students than for faculty. The question is: To what extent do people choose LACs because they are *liberal arts*? The data suggested that *liberal arts* is a need for students and faculty, but not as strong as many others.

The right side of *liberal arts* in the table is represented by reasons both traditional and new to the LAC context. While *personalized education* is a very traditional value of LAC, *career* and *internationalization* are less so. There is a reason to pay attention to the right end of the X axis, because this is an area where new values and needs emerge to either complement or disrupt traditional ones. Sense of relevancy was mentioned, albeit by few.

Besides the 18 shared themes, there were 9 student-only themes and 12 faculty-only themes. It suggested that students and faculty have some different values and needs when they choose their LACs. Figure 9 indicated that a certain student-only item has been mentioned 37 times out of a maximum 329, which means that 11.25 percent of total student values and needs are not relevant to faculty, e.g., *low cost*. 46 percent of the 37 student-only items belong to the theme of *affordability* which is a traditional challenge for high-cost LACs. This is distantly followed in order by *socialization, athletics, outcome, residential experience, ranking, technology, tradition*, and *governance* (see Appendix C).

Figure 9. Student-only themes of the reasons for choosing their LACs.

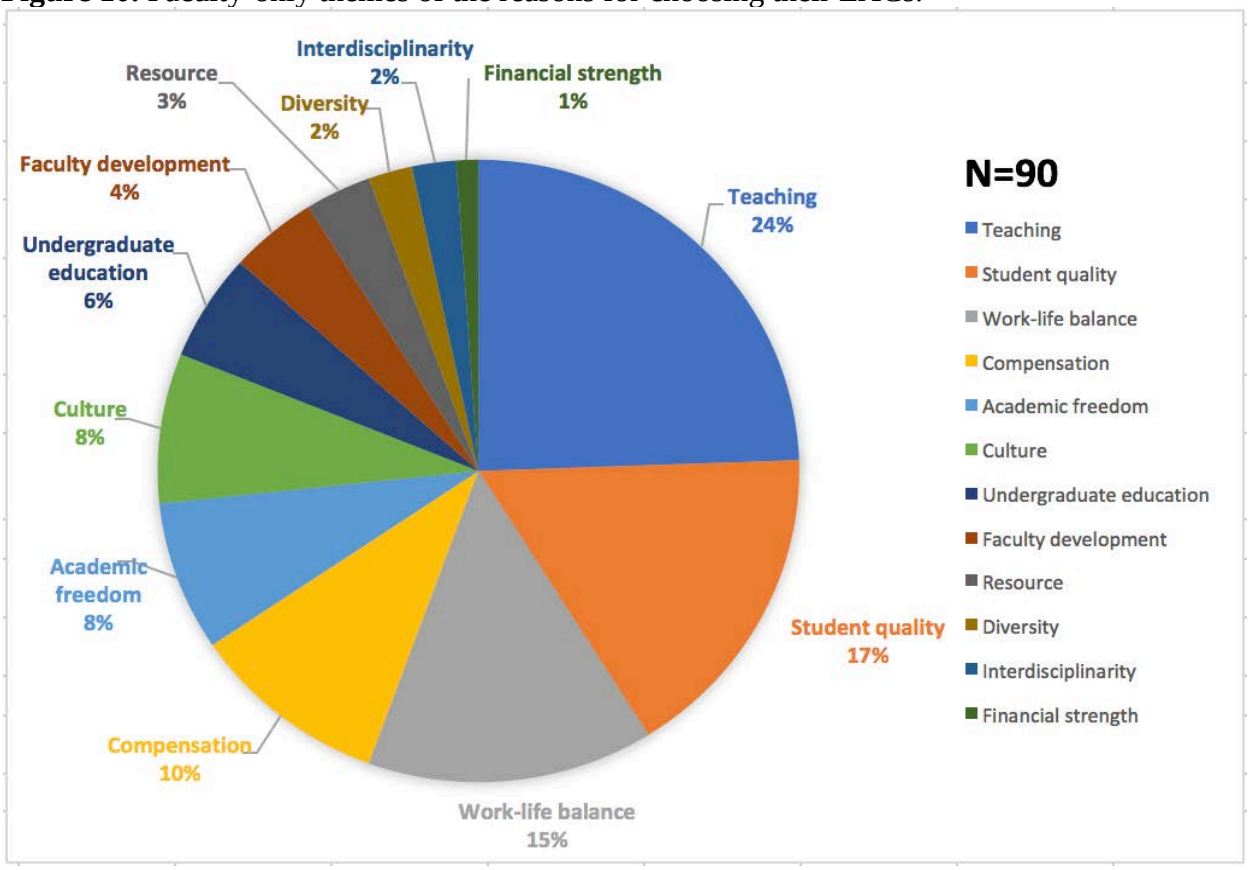


The 12 faculty-only themes are slightly more than the 9 student-only themes. Figure 10 indicated that a certain faculty-only item has been mentioned 90 times out of a maximum 321, which means that 28.04 percent of total faculty values and needs are not relevant to students, e.g., *work-life balance*. 24 percent of the 90 faculty-only items belong to the theme of *teaching* which is a traditional strength of LACs. This is followed in order by *student quality*, *work-life balance*, *compensation*, etc (see Appendix X).

The results indicated that almost half of the values and needs (18 out of 39 themes) are shared while the rest are student- or faculty-focused. There is an emphasis on *teaching* for faculty and *affordability* for students, which is characteristic of the LACs compared with other HEIs. It also suggested that while different stakeholder groups may share values and needs that are more aligned with what an institution tries to articulate, each of those groups may have

emerging values and needs that are new or even disruptive to an LAC, e.g., *internationalization* and *sense of relevance*.

Figure 10. Faculty-only themes of the reasons for choosing their LACs.



Being aware of emerging values and needs are important, not only because misalignment of values and needs across stakeholder groups would hinder the institutional mission, but also because new values and needs would provide opportunities for an institution to change, including opportunities for disruptive innovation. A lower percent of shared values and needs may actually suggest a higher chance of opportunities for those changes.

The analysis further examined the right end of the X axis in Figure 8 using the lens of *non-competition* and *job-to-be-done* from the 3+1 DI model. Despite lower representation, these

values and needs should not be ignored. Of the 18 shared themes, *career* and *internationalization* are at the lower mid-range of the X axis. Traditionally, LACs do not self-identify as career-focused and are attached more to local than to international contexts. In other words, *career* and *internationalization* are disruptive values and needs to a traditional LAC. LACs which self-identify as attractive to students and/or faculty due to disruptive values and needs are potentially institutions doing disruptive innovation. Similarly, questions can be asked about why *residential experience*, a traditional LAC value and need, is lowly ranked among the student-only themes (see Figure 9). Overall this section suggested that new values and needs such as *career*, *internationalization*, and even *sense of relevance* are emerging. At the same time, however, traditional values and needs such as *liberal arts* and *residential experience* are not dominant.

4.2.3 Contextualizing *unbundling*: Focus and relevance of LACs

Survey Question 4: On a scale of 1 to 10 (where 1 = very low and 10 = very high), how would you rate the IMPORTANCE of each of the following items to a successful liberal arts HEI in the United States? (see Appendix X for the list of items)

A successful higher education institution is like a well-oiled machine with different parts playing their indispensable roles. It is hard to imagine colleges and universities could achieve their articulated missions without a talented academic core, a highly professional staff, and synergistic support mechanisms. However, there are times when resource constraint could subject this all-round ideal to calculated priority, which is becoming more likely to the liberal arts colleges. Burlington college, a private not-for-profit LAC in Vermont, ceased operations on 27 May 2016 due to financial constraints after Sweet Briar College almost did the same in the summer of

2015. Under this climate, evaluating and prioritizing key offerings is important for the continued success and, in some cases, survival for the U.S. liberal arts colleges.

Table 10 summarized the senior administrators' opinions about key components of a successful LAC by rating them on a 10-point *importance* scale. Arranged in order of mean value from high to low, the key components, except for new ones suggested by the participants, are led by *interdisciplinarity* (8.62) and end with *vocational programs* (3.01). No participant rated *interdisciplinarity* below "6" and no participant rated *vocational programs* at "10". The standard deviation values for both items (1.25 and 1.95 respectively) are lower than many others, which indicates a high level of consensus on their importance (or lack thereof) to a successful LAC.

Table 10. Senior administrators' opinions on the importance of key components of a successful LAC.

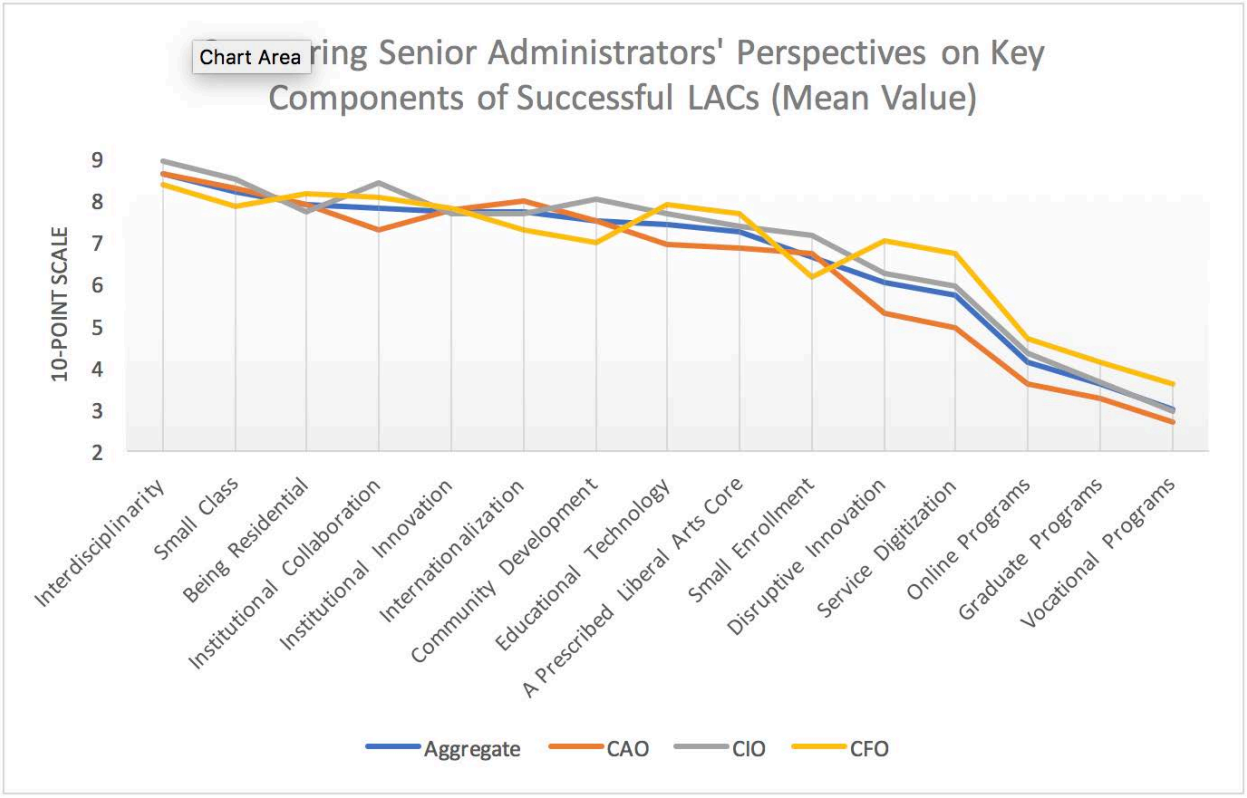
Key Components	Minimum	Maximum	Mean	Std Deviation	Variance	Count	Bottom 3 Box	Top 3 Box
Interdisciplinarity	6	10	8.62	1.25	1.55	111	0.00%	79.28%
Small Class	3	10	8.2	1.53	2.34	111	1.80%	72.97%
Being Residential	1	10	7.89	1.91	3.66	110	4.55%	71.82%
Institutional Collaboration	1	10	7.79	1.82	3.32	111	2.70%	64.86%
Institutional Innovation	3	10	7.72	1.67	2.8	110	1.82%	57.27%
Internationalization	2	10	7.69	1.84	3.4	110	3.64%	64.55%
Community Development	2	10	7.5	1.75	3.08	111	2.70%	54.95%
Educational Technology	3	10	7.4	1.67	2.78	111	1.80%	50.45%
A Prescribed Liberal Arts Core	1	10	7.24	2.31	5.34	111	9.91%	60.36%
Small Enrollment	2	10	6.64	1.94	3.78	111	7.21%	36.94%
Disruptive Innovation	1	10	6.02	2.1	4.42	110	12.73%	24.55%
Service Digitization	1	10	5.72	2.29	5.25	111	17.12%	25.23%
Online Programs	1	10	4.13	2.52	6.33	110	46.36%	13.64%
Graduate Programs	1	10	3.6	2.74	7.5	111	60.36%	12.61%
Vocational Programs	1	9	3.01	1.95	3.79	110	65.45%	2.73%
Other	5	10	8.67	1.8	3.22	12	0.00%	83.33%

Both *liberal arts* and *disruptive innovation* are in the middle of the table, with *liberal arts* slightly ahead in ranking but significantly higher in mean value (7.24 and 6.02 respectively). Interestingly, the standard deviation values for *liberal arts* and *disruptive innovation* (2.31 and 2.1 respectively) are both higher than all the items above *disruptive innovation*, which indicates a

lack of consensus on their respective importance to a successful LAC. Also interesting is that while *liberal arts* is far ahead of *disruptive innovation* in the case where one is rated no lower than "8" (60.36 and 24.55 percent respectively), the margin significantly diminishes in the case where one is rated no higher than "3" (9.91 and 12.73 percent respectively). Furthermore, the percent of participants rating *liberal arts* no higher than "3" is higher than any other item above *disruptive innovation*. It strongly suggests that *liberal arts* is not considered significantly more important than many other key components to a successful LAC in the United States. Some of the traditional aspects of LAC, e.g., *interdisciplinarity* and *small class*, are far ahead!

The table also reflected two interesting findings. First, while *interdisciplinarity* is considered highly important to a successful LAC, it is not strongly mentioned as a reason for students and/or faculty choosing their LACs (see Figures 8, 9, and 10). Second, *internationalization* is also considered highly important to an LAC, but again is not a strong reason for students and/or faculty choosing their LACs. One explanation is that neither interdisciplinariy nor internationalization is a traditional strength of LACs that attracts students or faculty. However, both are becoming increasingly important from an institutional perspective. Twelve *other* items are also considered strongly important to a successful LAC. Among them, *emphasis on vocation*, *(business and pre-professional) mixed programs*, *theory-practice connection*, and *data-informed decision-making* are considered highly important.

Figure 11. Comparisons between CAO, CIO, and CFO perspectives on the importance of key components of a successful LAC.



Do different senior administrator groups agree with each other? Figure 11 indicated that CAOs, CIOs, and CFOs generally agreed upon the importance of key components of a successful LAC. However, CFOs differed noticeably from CAOs and CIOs, especially upon the items of *disruptive innovation* and *service digitization*. Toward these two DI-related items, CFOs were more positive than CAOs or CIOs. CAOs were least positive, with their mean value falling below the aggregate. Figure 11 also indicated that while the CAO and CIO trajectories cling close to the aggregate trajectory, the CAO trajectory is constantly below the aggregate trajectory while the CIO trajectory is constantly above the aggregate trajectory. It suggested that CIOs were more positive than CAOs toward the items' importance to a successful LAC. The fact that senior

administrators differed in their opinions about the key components of a successful LAC is an interesting and potentially important finding of this study.

Survey Question 5: On a scale of 1 to 10 (where 1 = very low and 10 = very high), how would you rate your institution's COMMITMENT to each of the following items? (see Appendix X for the list of items)

Consensus on the importance of key components of a successful LAC does not automatically translate into institutional commitment. Institutional characteristics (e.g., urban vs. rural setting) and financial strength among others will impact upon an LAC's strategic priority of one component over another. Table 11 summarized the senior administrators' opinions about key components of an LAC by rating them on a 10-point *commitment* scale.

Table 11. Senior administrators' opinions on their institutions' commitment to the key components of an LAC.

Key Components	Minimum	Maximum	Mean	Std Deviation	Variance	Count	Bottom 3 Box	Top 3 Box
Being Residential	1	10	9.05	1.56	2.43	108	1.85%	87.04%
Small Class	3	10	8.58	1.44	2.08	109	1.83%	83.49%
Interdisciplinarity	3	10	8.29	1.52	2.3	109	0.92%	70.64%
A Prescribed Liberal Arts Core	1	10	8.14	2.24	5	109	5.50%	72.48%
Community Development	3	10	7.61	1.84	3.39	109	2.75%	56.88%
Small Enrollment	1	10	7.47	2.08	4.34	108	8.33%	57.41%
Internationalization	2	10	7.33	2.07	4.28	107	4.67%	51.40%
Institutional Collaboration	1	10	7.14	1.91	3.66	109	4.59%	47.71%
Institutional Innovation	1	10	6.85	1.99	3.98	109	5.50%	42.20%
Educational Technology	1	10	6.45	1.95	3.79	109	7.34%	33.03%
Disruptive Innovation	1	10	5.01	2.03	4.12	109	21.10%	12.84%
Service Digitization	1	10	4.83	2.16	4.67	109	32.11%	10.09%
Graduate Programs	1	10	3.72	2.96	8.79	109	56.88%	18.35%
Online Programs	1	10	3.36	2.47	6.1	109	63.30%	10.09%
Vocational Programs	1	10	2.58	1.97	3.89	108	76.85%	1.85%
Other	1	10	7.43	2.77	7.67	7	14.29%	71.43%

Arranged in order of mean value from high to low, the key components, except for new ones suggested by the participants, are led by *being residential* (9.05) and end with *vocational programs* (2.58). Despite the huge margin, there are participants rating *being residential* at "1" and *vocational programs* at "10", which indicates existence of extraordinary situations. The standard deviation values for *being residential* and *vocational programs* (1.56 and 1.97 respectively) are lower than many others, which indicates a high level of consensus on their attractiveness (or lack thereof) to institutional commitment.

Liberal arts and *disruptive innovation* are more separated from each other than they are in Table 11, with *liberal arts* significantly higher in ranking and mean value than *disruptive innovation* (8.14 and 5.01 respectively). The standard deviation values for *liberal arts* and *disruptive innovation* (2.24 and 2.03 respectively) indicate a moderate level of consensus on institutional commitment compared with other items. *Liberal arts* is also significantly ahead of *disruptive innovation* when one is rated no lower than "8" (72.48 and 12.84 percent respectively), an even wider margin than it is between them in Table 10. The margin is also wider between *liberal arts* and *disruptive innovation* than they are in Table 10 in the case where one is rated no higher than "3" (5.50 and 21.10 percent). Interestingly, the percent of *disruptive innovation* being rated at the mid-third range ("4" to "7") is higher than any other item in the table (66.06 percent with *educational technology* being second at 59.63 percent). A possible explanation is that the LACs are very uncertain about investing in *disruptive innovation* and, to a lesser extent, *educational technology*.

The participants also mentioned 5 *other* items (for a total of 7 times) to which their LACs have a moderate level of commitment (7.43 in mean value). The 5 *other* items are *service learning*, *mixed programs*, *theory-practice connection*, *experiential learning*, and *sustainability*.

Notice that *mixed programs* and *theory-practice connection* have also been mentioned in Table 10 as an *other* item. The decreased mean value may suggest that the LACs should commit more to *mixed programs* and *theory-practice connection* in proportion to their importance to a successful LAC. To summarize this table, *liberal arts* attracts far more commitment from the LACs than *disruptive innovation* at this moment, despite a narrower margin between the two in terms of importance to a successful LAC.

Survey Question 6: On a scale of 1 to 10 (where 1 = very low and 10 = very high), how would you rate each of the following items according to its CONTRIBUTION to your institution's mission? (see Appendix X for the list of items)

A third dimension for examining strategic priorities of the LACs is contribution of key components to institutional mission: To what extent does an important component, with strong institutional commitment, contribute to the institutional mission?

Table 12. Senior administrators' opinions on key components' contribution to institutional mission.

Key Components	Minimum	Maximum	Mean	Std Deviation	Variance	Count	Bottom 3 Box	Top 3 Box
Being Residential	2	10	8.87	1.47	2.17	103	0.97%	84.47%
Small Class	2	10	8.38	1.63	2.64	103	0.97%	77.67%
A Prescribed Liberal Arts Core	1	10	8.23	2.45	5.98	102	8.82%	79.41%
Interdisciplinarity	2	10	8.19	1.77	3.13	103	1.94%	67.96%
Community Development	1	10	7.56	2.01	4.03	102	3.92%	57.84%
Small Enrollment	2	10	7.23	2.22	4.94	103	8.74%	50.49%
Internationalization	1	10	7.15	2.41	5.79	102	10.78%	51.96%
Institutional Collaboration	1	10	6.83	2.34	5.48	103	9.71%	43.69%
Institutional Innovation	1	10	6.69	2.33	5.42	103	9.71%	41.75%
Educational Technology	1	10	6.06	2.17	4.72	103	15.53%	25.24%
Disruptive Innovation	1	10	4.82	2.26	5.1	103	30.10%	12.62%
Service Digitization	1	10	4.6	2.3	5.28	102	40.20%	10.78%
Online Programs	1	9	3.06	2.46	6.05	103	66.02%	7.77%
Graduate Programs	1	10	3.03	2.86	8.18	103	69.90%	14.56%
Vocational Programs	1	10	2.85	2.47	6.11	103	69.90%	9.71%
Other	3	10	8.67	2.56	6.56	6	16.67%	83.33%

Arranged in order of mean value from high to low, the key components in Table 12, except for new ones suggested by the participants, are led by *being residential* (8.87) and end with *vocational programs* (2.85). Despite the huge margin, there are participants rating *being residential* at "2" and *vocational programs* at "10", which indicates existence of extraordinary situations. The standard deviation value for *being residential* (1.47) is lower than any other item, which indicates a strong consensus on its contribution to the LAC missions. The standard deviation value for *vocational programs* (2.47) is second highest after *graduate programs* (2.86), which indicates a low level of consensus on its contribution to institutional mission. There are also 9.71 percent of the participants rating no lower than "8" for *vocational programs*, which is much higher than it is in Table 10 (2.73 percent) and 11 (1.85 percent). It suggests that *vocational programs* "helped" some LACs even if they are not considered *important* and do not receive substantial *institutional commitment*.

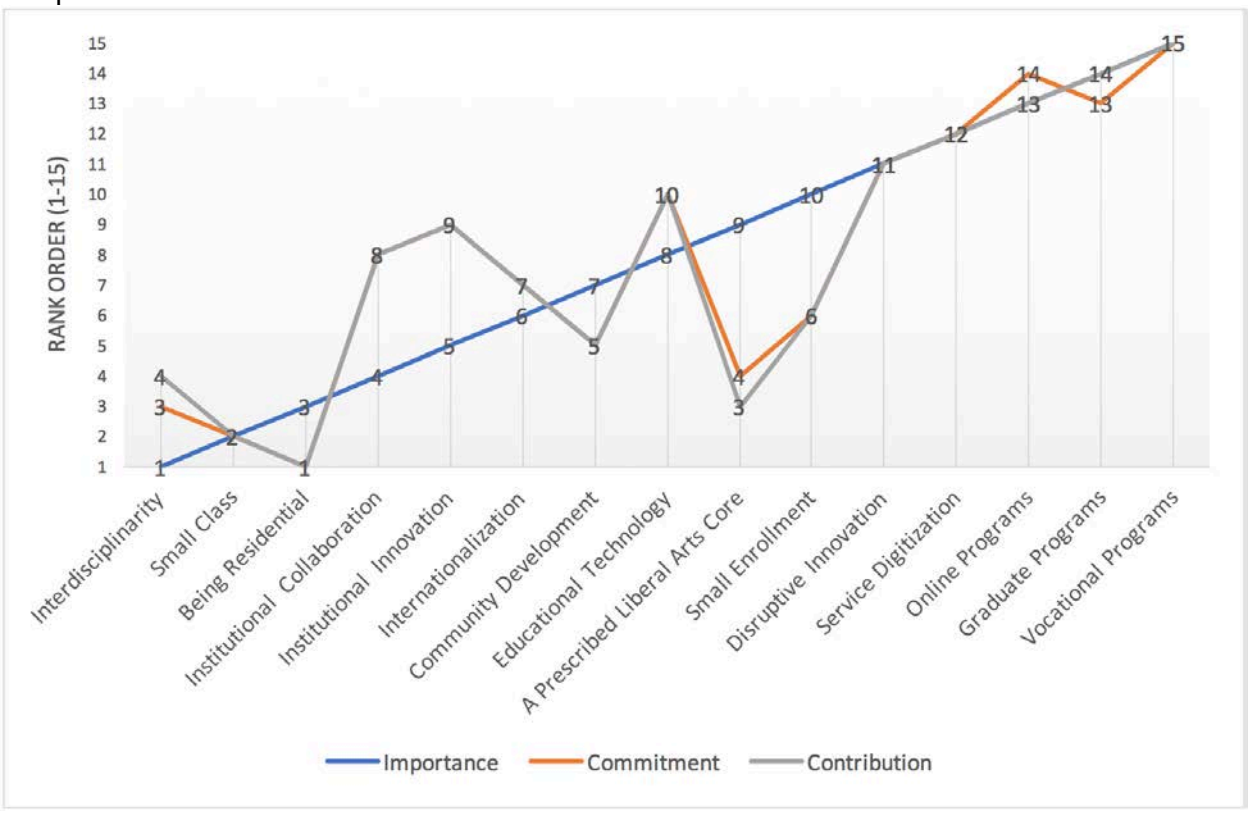
Liberal arts and *disruptive innovation* are more separated from each other than they are in Table 10 and 11, with *liberal arts* significantly higher in ranking and mean value than *disruptive innovation* (8.23 and 4.82 respectively). Their standard deviation values (2.45 and 2.26 respectively) are moderately high, with *liberal arts* higher than any other item above *disruptive innovation*. It suggested that although *liberal arts* has a high mean value (8.23), there are situations where it is rated extremely low. In fact, 8.82 percent of the participants rated *liberal arts* no higher than "3", which is significantly higher than any item above *small enrollment* (*community development* being second highest at 3.92 percent). In other words, *liberal arts* is more often considered low in contribution to institutional mission than *being residential*, *small class*, *interdisciplinarity*, and *community development*! Similar to the situation in Table 11, the percent of *disruptive innovation* being rated at the mid-third range ("4" to "7") is

higher than any other key component except *educational technology* (57.28 and 59.23 percent respectively). A possible explanation is that the LACs are very uncertain about the contribution from *disruptive innovation* and *educational technology* to institutional mission.

The participants also mentioned 5 *other* items (for a total of 6 times) that are considered highly contributive to institutional mission (8.67 in mean value). The 5 *other* items are *mixed programs*, *experiential learning*, *sustainability*, *commitment to spiritual formation*, and *community support*. *Mixed programs*, *experiential learning*, and *sustainability* are also mentioned in Table 11, which indicates a level of alignment between *institutional commitment* and their *contribution*.

Normally, a higher education institution performs well if its *important goals* receive commensurate *institutional commitment* and *contribute to institutional mission* accordingly. Misalignment between the three factors (*italicized*) is likely to hinder the institution from realizing its goals. If we consider each key component in Tables 10, 11, and 12 an important goal, then is there an alignment between the three factors for each of the component? For example, the results show that *interdisciplinarity* is highly important to a successful LAC. But does it receive commensurate institutional commitment and contribution to institutional mission accordingly?

Figure 12. Alignment between the importance, commitment, and contribution factors for the key components of an LAC.



The key components in Figure 12 were arranged in order of *importance* from high to low. For example, *interdiscilinarity* is considered more important than *vocational programs* to a successful LAC in Table 10. Therefore, *interdiscilinarity* is ranked higher (1) than *vocational programs* (15) in this Figure. The Figure indicates a strong alignment between the *commitment* and *contribution* trajectories as well as a strong misalignment between these two trajectories and the *importance* trajectory. In other words, a key component (e.g., *liberal arts*) with high institutional commitment (4^{th}) and contribution (3^{rd}) is not necessarily attached with commensurate importance (9^{th}). The three trajectories are more aligned for *disruptive innovation*, *service digitization*, *online programs*, *graduate programs*, and *vocational programs* which are in the lower-third range (11^{th}-15^{th}) of the ranking. In other words, they are less important to a

successful LAC and accordingly receive less institutional commitment and contribute less to institutional mission. The general misalignment for two-thirds of the key components (1^{st}-10^{th}) raises questions on the strategic priorities of the LACs: What adjustments need to be made to those that are *more important* to an LAC? What adjustments need to be made to those that are *less important* to an LAC? What can be *unbundled*? What can be *rebundled*?

4.2.4 Existence of DI examples at U.S. liberal arts colleges

The online survey asked the participants an intriguing question: Are you aware of a current example of disruptive innovation at your institution? To avoid diversion from the working definition of *disruptive innovation,* A short text was inserted at the very beginning of the survey:

> Classic Clayton Christensen's disruptive innovation theory suggests that a *disruptive innovation* is a simpler and cheaper solution for customers that, by virtue of technological advancement and following the marketing principles of *non-competition, job-to-be-done*, and *unbundling*, emerges to challenge an existing solution that is more complex and expensive. Disruptive innovation is antithetical to *sustaining innovation* which brings about steady and incremental change. Massive Open Online Course (MOOC) is an example of disruptive innovation in higher education. This survey examines the context of U.S. liberal arts higher education institutions (HEIs) in order to better understand DI's practical implication on the U.S. higher education sector.

Of the 94 participants who responded to this question, 43 (or 41 percent) responded *Yes* and 61 (or 59 percent) responded *No*. Without neglecting the fact that 17 of the 97 participating LACs have more than one individual participant, the percent is high enough for examining examples of disruptive innovation in the LAC context.

Figure 13. Are you aware of a current example of disruptive innovation at your institution?

When asked to briefly describe the examples of disruptive innovation, the 43 participants covered 17 themes after coding. The 17 themes are online program (5), interdisciplinarity (4), partnership (4), location (3), summer program (3), digital liberal arts (2), doctoral program (2), financial model (2), demographic needs (2), cloud-based administration (1), competence-based education (1), faith (1), library services (1), new campus (1), outsourcing (1), R&D (1), and survival (1). 8 of the 43 responses are not coded either because of insufficient information or because the example is nowhere near a disruptive innovation. Here is an example:

> We are cohorting entering first year students into quadrants that indicate high or low risk for academic success and high or low risk for retention. We are using data from a variety of sources to cohort students (high school GPA, socio-economic factors, history of engagement with [our institution] prior to application, etc.). We then have created advising tracks for students in each quadrant.

Although it is a fine innovation for improving student retention, it suggests nothing disruptive. It does not deal with issues related to new value (or non-competition), new need (or job-to-be-

done), or new model (or unbundling) that are part of the 3+1 DI model. In comparison, the following is a fine example of disruptive innovation:

> Our institution itself is an example. While not a disruptive innovation yet, it has the potential to become such as we have entered a niche market seeking to attract students who are members of the Church of Jesus Christ of Latter-day Saints and others of similar values. While we do not seek to displace other like institutions, there is no other institution like us our size. Hence, we offer another, and only, alternative to much larger Church affiliated institutions.

Besides articulating *disruptive innovation* in his/her response, this participant touched upon components of the 3+1 DI model. Particularly, a new value (*small* LAC for LDS-affiliated students) is introduced when the participant mentioned that "we offer another, and *only*, alternative to much larger Church affiliated institutions."

Institutional survival is another theme for the examples of disruptive innovation. Sweet Briar College is a women's liberal arts college on the verge of closure in 2015 due to insurmountable financial challenges. While much is known about the legal action involved to rescind the closure decision, less attention is paid to the disruptive but effective measures to help sustain the college after the rescission, which includes increasing enrollment beyond its highest record in the past. According to the participant,

> Our school was almost closed down by a former administration. The school was saved by passionate alumnae, faculty, staff, students and the local community. Our existence is coming out of the ultimate disruptive innovation and many things are changing in terms of how we are conceiving the future of the college.

The lesson learned from Sweet Briar College is not readily applicable to other LACs, nor is it a proven approach to sustainable development. However, it allows a peek into a scenario where DI helps deliver the much-needed result (financial stability) and provides opportunities for change.

The college had its 13th president instated on 15 May 2017 to kick off a new journey that would not be possible without disruptive innovation. There are certainly other LACs that endure financial constraints, some even to the point of closure such as Burlington College in 2016, for which Sweet Briar College will serve as a useful reference.

Disruptive innovation is also believed to exist in a less turbulent environment. One participant shared an example of how DI facilitates interdisciplinarity by disrupting the traditional notion of *academic department*.

> We are bringing 13 humanities and social studies departments together in a new, interdisciplinary academic complex. Faculty will office and work in "neighborhoods" with a mix of disciplines and an array of learning spaces. There will be no clear department-specific areas anywhere in the facility. The intent is to mirror the diversity of the real world and create an environment ripe for interdisciplinary teaching, learning, and intellectual "collisions".

Norm-to-need transitions are frequently mentioned as the LACs use different strategies to satisfy emerging student needs. In one case, the needs entail reimagining the norm of *summer semester*, as one participant shared that “online summer course offering is being driven by student demand [while] previously summer courses were only available on campus and very, very limited in offering.” In another case, liberal arts education extends beyond the norms of *undergraduate education* and *residential education* to accommodate learning needs of a more diverse student body. On that note, a participant shared that their institution is “experimenting with developing programs for adult learners at corporate partner sites [and] have also developed [its] first online degree program for adult learners.”

The growth of doctoral programs was also mentioned as an example of DI that is likely to disrupt the norm of *undergraduate education* when they compete for space and resources. A second campus is uncommon to LACs, even more so when the expansion comes to graduate

programs at the expense of undergraduate programs. One participant shared about the disruptive changes that came from a new doctoral program:

> The implementation of a physical therapy doctoral program happened rapidly and led to a graduate health sciences school being established and a second campus being developed. This has led to a number of undergraduate program changes in order to "feed" students to these graduate programs.

Finally, information technology has an increasingly disruptive impact on the traditional management practices of the LACs. One participant shared about how cloud-based information technology helps shape a “collaborative connectivity” with peer LACs and students:

> On the administrative side that impacts all, the move of IT/technology from local-based to cloud/global. Recent broadband connectivity has opened up the ability to manage technology infrastructure seamlessly throughout on-prem and cloud-based environments as well as provide “collaborative connectivity” with other institutions, broadening the campus footprint to one of a more global nature. Managing ERP’s in the cloud, with students accessing via any device is another outcome of this disruption.

4.2.5 Summary of findings from the online survey

It is helpful to bring together some of the findings midway through this dissertation to continue the inquiry into the domains of awareness, conceptualization, example, and reflection on disruptive innovation in U.S. liberal arts colleges. Some of the key findings include

- There is a strong awareness of and a moderately positive attitude toward DI from the participants;
- CIOs and CFOs have a more positive attitude toward DI than CAOs;
- There are significantly more differences between LACs and other HEIs than between LACs;

- There are a significant number of needs that are not served by either LACs or other HEIs;
- Technology is increasingly important in facilitating the missions of LACs.
- Students and faculty of LACs have distinctly different sets of values and needs. Even among those they share, they tend to be ranked differently in terms of how important they are to students and faculty;
- *Liberal arts* as a concept is not as attractive to students and faculty as are some of the more tangible aspects of LACs, e.g., reputation, small size, location;
- New values and needs are emerging, e.g., internationalization;
- Again, *liberal arts* as a concept is not as highly regarded as some of the more tangible aspects of LACs (e.g., small class, being residential) when it comes to importance to a successful LAC, institutional commitment, and contribution to institutional mission;
- *Disruptive innovation* as a concept is not highly regarded when it comes to importance to a successful LAC, institutional commitment, and contribution to institutional mission;
- CFOs differ from CAOs and CIOs by showing a more positive attitude toward *disruptive innovation*, *online programs*, *graduate programs*, and *vocational programs*;
- There is a misalignment in the sense that key components of LACs do not receive institutional commitment or contribute to institutional mission commensurate to their importance;
- Examples of disruptive innovation exist in the LAC context, with no small variety!

The following sections drew upon qualitative data collected from the 20 in-depth interviews to further enlighten the inquiry.

4.3 RESULTS OF DATA ANALYSIS ON THE FOLLOW-UP INTERVIEWS

This section focused on the qualitative data collected from 20 in-depth interviews with the senior administrators from 19 participating LACs. The analysis helped revisit and/or explore:

- The strengths of U.S. liberal arts colleges,
- The weaknesses of U.S. liberal arts colleges,
- The extent of DI changing the status quo of U.S. liberal arts colleges,
- The opportunities DI brings to U.S. liberal arts colleges,
- The threats DI brings to U.S. liberal arts colleges,
- The role of DI in institutional innovation of U.S. liberal arts colleges,
- DI examples from the 19 participating LACs, and
- Additional reflections.

4.3.1 The strengths of U.S. liberal arts colleges

One important question to ask of the U.S. liberal arts colleges is why there are still misconceptions about these institutions when *critical thinking* and *residentiality*, terms traditionally associated with LACs, have long become cliché? One CFO of a New York-based LAC considered it “bad perception” in regard to the “discord out there about whether there is a value or strength to a liberal arts education” (LAC02-01). There seems to exist a long ravine between the understandings of those working within an LAC and those who appear to know these institutions fairly well. Given that, it is fairly important to first re-establish the historical strengths and weaknesses of these institutions.

The strengths of the U.S. liberal arts colleges generally fall into two categories: institutional strengths and pedagogical strengths. Institutional strengths are perhaps the less discussed of the two considering people tend to readily accept that these institutions are small and few. However, the two attributes support a number of tenets of liberal arts education. First of all, the fewer number of LACs than other HEIs in the U.S. does not necessarily cripple their diversity in multiple senses. A CFO of a Vermont-based LAC reflected that it is difficult to answer an LAC-related question given "the diversity one can find in institutions that think of themselves as liberal arts colleges. [That] is [in addition to] a diversity of programs unlike anything I think you will find anywhere else in the world" (LAC03-01). As an example, he shared with the researcher that his institution is perhaps "the only liberal arts school that you will find that has a course labeled 'tools', which includes how to sharpen your axe." This dual sense of diversity on institutions and programs is further enhanced by a freedom to customize liberal arts education befitting a local context and need. A CIO of an LA-based LAC reflected on how it is often an "additional sensibility" rather than the institutional mission per se that serves as a differentiator and help LACs to thrive.

> In our case, we have founding cornerstones of excellence that we call equity and excellence that sort of tone up our mission. A lot of the work that we do amplifies the broader themes of what you can do at the liberal arts colleges. It does so in the context of engaging communities in Los Angeles, particularly the communities in North East, Los Angeles working with community partners in a curricular and co-curricular context. (LAC12-01)

The pedagogical strengths also fall into two categories: adaptability and residentiality. While not meant to readily become specialized professionals, students of liberal arts colleges are "well-rounded" (LAC13-01) and can "adapt to a changing world" (LAC17-01). A CFO of an Iowa-based LAC placed it with a more emphatic note:

> They don't arm students with a specific set of skills for a specific profession. That might change drastically by the time a student graduates or shortly after graduation. But rather gives them more generalize skills that are nimble and agile in the face of a changing world. (LAC17-01)

Understanding of and coping with an increasingly complex world and volatile job markets is what sets LACs fundamentally apart from other HEIs. "The world is getting more, and more, and more complex" (LAC02-01). While not boasting of a cookie-cutter specialized skill, LAC students use "critical thinking" (LAC10-01) and "problem solving" (LAC18-01) tools to determine "long-term" (LAC10-01) benefits that go beyond "passing a test and getting a job" (LAC02-01). It is no wonder that even without a defined specialization, LAC students show promising outcomes:

> Most contemporary liberal arts colleges, especially private ones, have better graduation rates, four-year, six-year graduation rates, than technical or state schools. I think it is because the experience that they have goes beyond technical book learning. (LAC02-01)

Focusing on developing the adaptability skills by no means hampers students' ability to make early decisions on their careers. Leadership and business are two fields that synergize well with liberal arts skill sets. A CIO of an Indiana-based LAC shared on how the broad curriculum framework is a natural greenhouse for future leaders regardless of their career aspirations:

> The typical student will have a major where you take a deep dive into a particular discipline or major of interest, but you also have a broad type of experience of different types of disciplines that you learn, as well, which helps you make connections between things in ways that are very valuable, particularly for leaders in the world, to be able to have that well-rounded curricular disciplinary background. (LAC19-01)

The scope of vision facilitated to the best capability of a liberal arts college for students is also tailor-made for the profile of a business professional. A president of a California-based liberal

arts university shared his first-hand experience of learning assessment along with over 2000 businesses:

> I was on the workforce advisory committee for ACT. And we actually developed Work-Cheese, which is an assessment tool that was developed with manufacturers and 2,000 businesses. They were very interested in mastery of certain skills. But fundamentally they were interested in "Can the graduate think critically? Do they understand all of their cultures? Can they take a project, start it and complete it? How are their people skills, how they interact with clients? How do they solve problems when they are confronted with problems?" All of those things, they are taught in the broadest sense in liberal arts colleges. (LAC18-01)

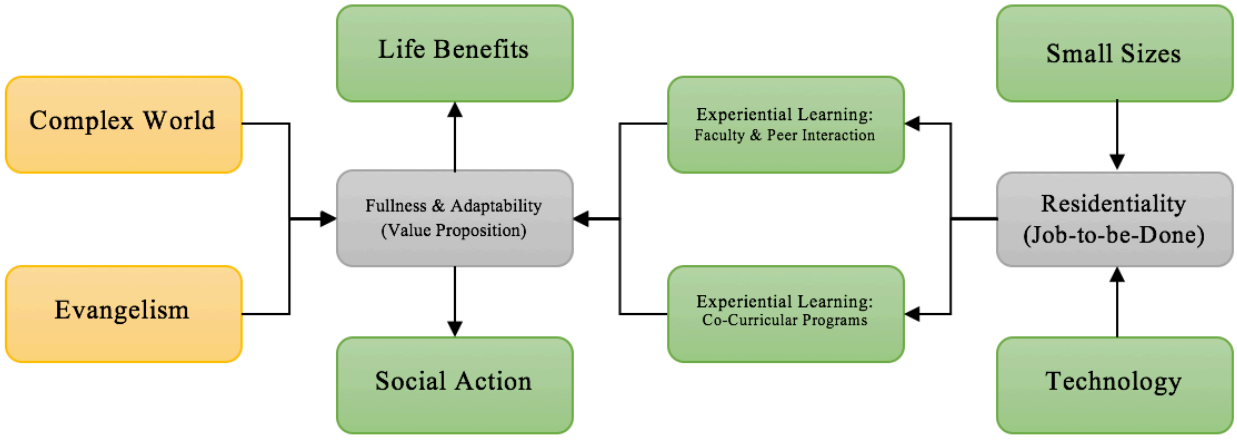
The profile of a highly adaptable LAC student does not finish without a "passion for making a difference in the world" (LAC11-01). Instead of "producing members of the workforce", LACs produce "active citizens" (LAC01-01) who are able to make sound judgments about what's best for the greater community and commit self-informed actions. The component of character development is strongly advocated in an LAC curriculum.

To help educate highly-adaptable students in the face of an increasingly complex and volatile world, most LACs adopt rigid practices of residentiality. These doctrinal practices facilitate a number of interwoven aspects of a liberal arts curriculum. Front and center is a wealth of co-curricular programs that substantially expands the boundaries of learning across "passing a test and getting a job". These "non-academic ways of learning" through "student clubs, organizations, student government, fraternity, and sororities" (LAC05-01) are made more available by a high level of residentiality through rich after-class experiences. High residentiality also prolongs the day-to-day periods of student interaction with faculty and their peers, which is further enhanced by small school sizes, small class sizes, and low student-to-faculty ratios.

Overall, the education model of LACs and its strengths can be summarized by the following figure, with adaptability and residentiality being the two centerpieces supporting

various aspects and expectations of otherwise a highly diverse LAC population across the country.

Figure 14. Mind map of the strengths of the U.S. liberal arts colleges.



Liberal arts colleges are never short of distinct strengths that may or may not be known to the general public. These strengths range from broad institutional attributes to very minute and niche program offerings. However, never before has a coherent voice been heard as to how these strengths add up to something truly convincing. Re-establishing the strengths of LACs helps identify not only the strengths per se, but also the value propositions and jobs-to-be-done of these institutions. These are two areas where DI may or may not have a true impact.

4.3.2 The weaknesses of U.S. liberal arts colleges

The other side of the coin is a number of weaknesses centering upon issues related to a lack of change, high cost, and a lack of voice among others. Liberal arts colleges are traditionally not considered at the forefront of institutional change with or without a technological nature, and this is also echoed by the majority of the interviewees. The distinct strengths of the LACs at times

may have become rationales for being self-perpetuating. “Interestingly, our strength is also our weakness”, said a CFO of an Iowa-based LAC when reflecting on the broad and somewhat vague knowledge base of their students, because parents and employers have a different opinion of the fact that “[their] students do not graduate with a very specific career outcome design for them” (LAC17-02). Adding to this dilemma of divided opinions are thoughts on whether change is imperative in the context of LACs. A CFO of a Pennsylvania-based LAC share her thoughts on the distinct mode of change of these institutions:

> [Lack of change is] a vulnerability potentially, but we might also see it as an asset related to the values-centeredness and the mission-centeredness of these institutions, that they’re slow to change.... So, innovation tends to be incremental, and not disruptive or revolutionary. (LAC08-02)

These opinions are joined however with a more direct and uniform voice that institutional changes are long overdue, for which many LACs are paying a heavy toll. A CIO of a Massachusetts-based LAC bemoaned a lack of “drivers for change until the last 3-5 years” and that their LAC has “difficulty changing the model from face-to-face teaching and service to other modes like online” (LAC09-02). A CFO of an Indiana-based LAC shared that their “single biggest weakness is lack of agility in recognizing needed changes and making them.” Apart from that, many of her colleagues are “still in denial of the impact of the technology revolution that has so impacted students” (LAC11-02). A CIO of an Ohio-based LAC reflected on the negative impact and believed that many LACs “move too slowly at times, thereby relying on outdated practices that are many times inefficient” (LAC13-02). Longevity at times brings a false sense of security and that, according to a CIO of an Indiana-based LAC, is a psychological barrier to change.

> Their institution might be 150 or 200 years old, and you hear a lot of "well, this is the way we've always done it here," and they tend to be less likely to be agile in adjusting to the new needs of today. (LAC19-02)

Perhaps none of the comments are more scathing than of the CAO of a California-based LAC upon an institutional culture, of both LACs and other HEIs, that is overly condescending to the requirements of the industry.

> The point is, those [LACs] with the biggest problems are due to the culture and orientation of higher education, because the hidebound traditions do not address the kinds of issues or move quickly enough to resolve problems. It makes it difficult to respond to a changing world. And often universities are at the end of the process, rather than at the leadership of it. For the purpose of innovation, it really should be spurred by universities, even if it's done overtly with industry. (LAC18-02)

This opinion is shared by a CFO of a New York-based LAC who all but concluded the issue about a lack of change with the following remarks:

> I think a lot of them are still living 300 years ago. I think they have forgotten that even though there is a great need for the liberal arts experience in the humanities, they have forgotten that the world really has changed. In fact, it has drastically changed that students today do need a connection drawn between learning philosophy, and Socrates, and other humanities, theater arts, into how to bring that into the world that they are living in right now. A lot of liberal arts colleges are having a hard time changing—changing their curriculum approach, changing the program offering, and leveraging new technologies for them in terms of course delivery. (LAC02-02)

The interviewees also expressed heavy concerns for the high cost of the liberal arts colleges. "Liberal arts colleges are increasingly in a financially fragile situation, so I think that's a definite weakness" (LAC05-02), said a CAO of a Missouri-based LAC. Such fragility is associated with the educational model of LACs often characterized by large personnel costs. A CIO of an Ohio-based LAC attributed this to the small sizes of LACs:

> I think one challenge for liberal arts colleges is that the model, which is the small classes model, where the ratio from students to faculty might be as low as ten to one and the average class size might be anywhere from eight to fifteen students, is that it's very costly because personnel costs are the single largest part of the cost of a liberal arts education. (LAC07-02)

A CFO gave a real account of the "crazy" tuition charged by his Pennsylvania-based LAC and lamented the lack of countermeasures.

> Next year we're looking at tuition coming close to $70,000 a year. Unbelievably, people still are willing to pay that, or believably. There's plenty of economic data that shows that it's a good long-term investment, but it is a crazy amount of money. There are very few ways to actually reduce costs, without undermining all of the academic components we offer. (LAC08-02)

Since the liberal arts colleges traditionally cater to "middle-class families" (LAC04-02), these families are "pushing back on price and choosing those that offer the best aid package" (LAC09-02), said a CIO of a Massachusetts-based LAC. This has a direct impact on the "tuition-dependent" LACs that are forced to focus on students who are able to pay the "outrageous" full tuition.

> $68,000 a year is the price of tuition and full board here. Now half of our students get financial aid, and we provide full financial aid to meet full need of all students that are admitted. That is outrageously expensive and that fact that we are tuition-dependent means that we have to pay attention to having sufficient proportion of the student body that can pay the full amount. It constrains us in some ways.... It's outrageously expensive. That really threatens it. Liberal arts colleges should not be boutiques. (LAC01-02)

One constraint is that those who are paying the high tuition expect even more than a liberal arts degree. "I think the higher price tag leads to students and parents expecting unlimited resources and support from the college" (LAC13-02), said a CIO of an Ohio-based LAC, which in a way leads to the next major weakness of these institutions.

"There are no sound bites for a liberal arts education... especially when we are charging as much we do" (LAC08-02). A CFO of a Pennsylvania-based LAC phrased this as a lack of "clarity of the value proposition" and went on and shared that "In a sound bite world, it's often hard to get people's attention long enough to explain what we're about and what the virtues of coming to a place like this are." This is quickly joined by a CIO of an Ohio-based LAC: "I don't think there is a full understanding of what liberal arts means. I came from a large public university and didn't really understand liberal arts until I was in that environment" (LAC13-02).

Tracing the causes for this lack of voice, a CFO of a Vermont-based LAC attributed it to a lack of "defined role" of LACs in the economic or educational system: "They have a defined role historically, but they are always finding their place in that framework and it changes and evolves" (LAC03-02). A CIO of a Pennsylvania-based LAC attributed it to a dilemma about demonstrating educational outcomes: "You can't monetize being a global citizen. You can't monetize helping our people in the community" (LAC04-02).

The high tuition charged by LACs certainly didn't help them raise their voice the way they want. Instead, students and often their paying parents are more concerned with employability than the value propositions (e.g., adaptability and residentiality) that LACs prefer to direct at. What is truly gaining sound bites are actually questions such as "what is my kid's employability?" or "what is my return on investment from this degree?" (LAC04-02)

The lack of voice also has a toll on LACs' traditional mission in social action. Instead of bringing voice to the broader community, these institutions are besieged with often ill-informed voices. According to a CIO of a New Hampshire-based LAC,

> Liberal arts colleges lack the voice of larger well-funded universities in getting the message and value of their strengths to the educational public. They lack the power to prevent the business world from dictating curriculum. Business has offloaded much of

> the training requirement to higher education. And that is the completely wrong focus for IHEs. (LAC10-02)

Overall, in additional to a lack of change and high cost, the LACs in the United States are facing a misconception as a result of a lack of voice. A CIO of an Indiana-based LAC conclusively depicted this weakness of the following words:

> There's a misconception that a liberal arts college implies that you're learning a lot about a lot of things, but you're not really becoming a master of anything per se, or that you're learning just for the sake of learning. Well, I don't believe that the stronger liberal arts colleges are like that. I think the misconception of them being that way makes it challenging for people to understand what the value is and how that might fit into their own personal goals as a prospective student, for example. (LAC19-02)

All of the three weaknesses that have been discussed have a debilitating effect on the educational model of LACs, and there are others. These comments focus on some areas between and/or beyond the three core weaknesses. A CFO of an Iowa-based LAC attributed the financial weaknesses to "a lack of capacity to get economies of scale" due to the small sizes of LACs. In her words,

> It is very expensive to provide that kind of personalized attention and that kind of breath of academic experience. You can't focus your curricular choices, or ramp up the size of your classes in order to save money. And as a result, we are suffering greatly from the cost pressures that come with a liberal arts education. (LAC17-02)

The nature of being small and as a result being unable to achieve economies of scale is also acknowledged by a CAO of a Missouri-based LAC, from a perspective of academic majors:

> I think that liberal arts colleges, because of their very nature, don't necessarily offer as wide a spectrum of academic opportunities, different majors, those kinds of things that other colleges and universities typically would have. (LAC05-02)

The ability of only offering a small number of majors meets with further restraints given that many new majors, thanks to scientific and technological development, typically do not find their roots from LACs. A CIO of an Ohio-based LAC reflected on majors in the professional fields and shared that:

> Students who are interested in subjects beyond what are often the classic liberal arts [are increasing]. Students are interested in subjects that are more professional, business or some profession in the medical services or nowadays it seems that criminal justice is a huge major. These are just not going to be found in liberal arts colleges. So, it means that the market for the liberal arts colleges is only those students who are interested in studying more of the classic liberal arts subjects: physics, mathematics, history, English literature, sociology, political science, chemistry, and so on. That's probably the distinction there. It means that liberal arts colleges have a smaller target base for recruiting students. (LAC07-02)

Interdisciplinarity is highly regarded in the context of LACs and is often considered the way out to counter the issue of economies of scale. But even that has its own issues when faced with the small sizes of LACs. A CAO of a California-based LAC questioned the feasibility of this strategy when things are simply not big enough:

> [Liberal arts colleges] tend to be smaller institutions which means that the ability to offer comprehensive and sometimes intersectional programming is limited. It's just a phase we have some departments that are two and three people deep. Whereas at a larger research institution you might find 15 or so people in the department like that. It just means that there's a little bit less in terms of opportunities to make connections within and across disciplines. (LAC12-02)

While being small has a certain toll on LACs financially, the changing demographics of the United States does not help, either. The traditionally stable student base of LACs is a potential cause to inertia and is certainly a contributor to their financial problems. According to a CFO of a New York-based LAC,

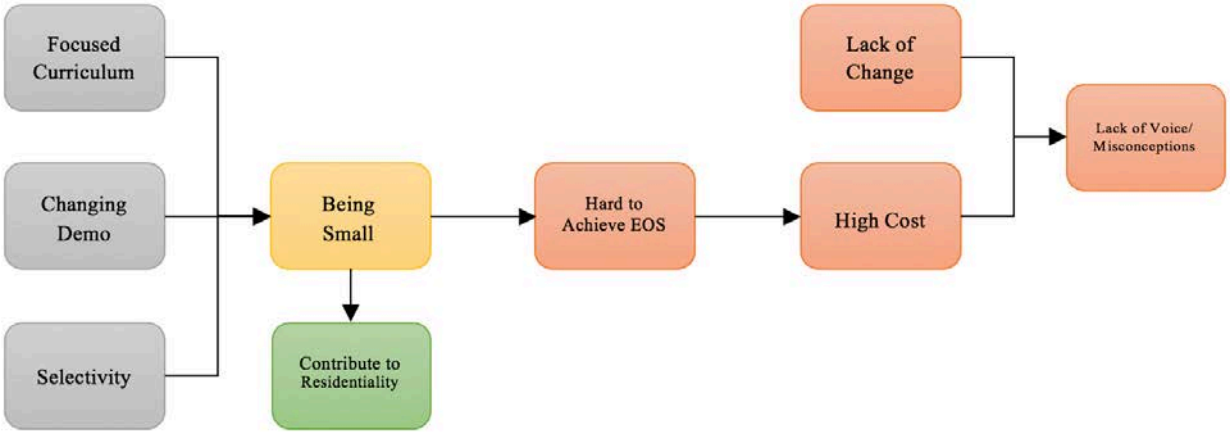
> There are only so many traditional residential 17- to 21-year-olds left out there, and the supply is far greater than the demand. Yet there is a massive adult learning market out there that would thrive in liberal arts colleges, but the colleges themselves are having a hard time adjusting to that. (LAC02-02)

The changing demographics can also be understood as a geographical redistribution of college-age students as well as an increase of first-generation and ethnic minority students nationwide. To the LACs that are unable to adjust to these changes, they end up losing students. According to a CIO of an Indiana-based LAC,

> [What's] going to be really critical for any of our institutions to be successful is to recognize the demographics of the students who are coming in is changing, and that the needs of the outcomes of their education are changing, and that we have to find the balance in order to meet those needs without letting go of what our core values are as liberal arts institutions. It's somewhat of a weakness, but it's also one of the key challenges that we're facing. (LAC19-02)

To summarize, being extremely expensive is always going to have a hard time getting a positive voice, and therefore increasing misconceptions about the LACs in the United States. This vicious cycle is complete when the LACs are slow to change, which in a way perpetuates their image as an expensive "boutique" (LAC01-01). What changes need to be brought in to kick up the change? The data also illustrate a distinctive factor in "being small" which links up various problems for the LACs (see Figure 15). Being a strong contributor to residentiality (see Figure 14), the traditional job-to-be-done of LACs, what can be done to it as a change to be brought into these institutions?

Figure 15. Mind map of the weaknesses of the U.S. liberal arts colleges.



4.3.3 The extent of DI changing the status quo of U.S. liberal arts colleges

Of the 20 interviewees, 7 indicated that disruptive innovation has changed the status quo of liberal arts colleges in the United States, 9 indicated that they have witnessed no such changes, and another 4 indicated that they are not sure.

Of the 7 interviewees who responded "Yes" to this question, 3 are negative about the nature of such changes, conceptualizing DI either as an imposition or as a co-agent with other social forces. A CIO of a Pennsylvania-based LAC reflected on how a lack of change puts LACs at a disadvantage to fast-pacing disruptive innovations:

> I think disruptive innovation is forcing small liberal arts colleges and large universities to face changes in society that they aren't prepared to face. Innovations like Uber, Lyft, Amazon, Google, those are all entities that higher education will have to chase, instead of leading. Therefore, they're not able to produce the workers that are necessary for the corporations that are driven by that kind of innovation quickly enough. (LAC06-03)

Being only able to "chase" rather than "lead" innovations and social movements is a hindrance to fulfilling the value proposition of social action of LACs. High cost and, as a result, skewed

public perception of higher education and LACs in particular also has a role in pushing LACs toward disruptive innovation, whether it means finding a way to resist DI or proactively adopting it. A CAO of a Kentucky-based LAC is confident about the educational model of her institution, but is less so as to whether that is enough to secure enrollment:

> I know that the disruptive innovation, particularly the impact of online education, is shifting a lot of practices. But one of the truths about liberal arts colleges is that they appear to be less subject to disruption. It is impacting us because I think it is one of the things that is causing there to be more likelihood for liberal arts colleges to suffer from declines in enrollment. But it is not necessarily changing our educational practices as much as it may be at some other institutions. (LAC14-03)

Less confident is a CIO of a Massachusetts-based LAC who shared that, despite the educational model, there is a real need to be vocal, along with necessary changes and improvements:

> [Disruptive innovation] is impacting us due to the changing public perception of higher education and the costs. We have to focus more on marketing student outcomes. The financial model of tuition discounting is also becoming harder to sustain. (LAC09-03)

Compared with the 3 interviewees who saw DI as a negative and imposing force, 2 interviewees believed that DI could be a positive and useful stimulus to help trigger internal changes of LACs. A CFO of an Indiana-based LAC reflected on her conversations with faculty members and believed that they are still "out of touch" with student needs in terms of technology and that DI "is slowly having an impact" (LAC11-03). The other interviewee, A CAO of a North Carolina-based LAC, went deeper to the discourse of value propositions of LACs as well as how essential it is for them to demonstrate these value propositions:

> I would say [disruptive innovation is] beginning to push back on a lot of the value assumptions of the liberal arts. So, what we assume we do well, through disruptive innovation, are being questioned. How do we prove that? What's the evidence that backs our claims that our students are prepared for an uncertain world? How do we prove that

> with data? And I think the biggest change you are likely to see going forward is liberal arts institutions doing the work of assessing the value of the liberal arts education because of disruptive innovation. (LAC20-03)

The remaining 2 interviewees shared that their LACs had taken a step further than thoughtful reflection toward purposeful incorporation of DI at their institutions. In one case, DI has been contextualized as a component of IT operations. A CIO of a Pennsylvania-based LAC shared about the example in his institution as well as the rationale behind it:

> Disruption, from my perspective here [at our institution], is really stemming from the information technology apparatus within liberal arts. And ultimately, what we are doing is we are embracing disruptive innovation, and it's kind of what we do in IT, so to speak. So, what we are ultimately doing is selling the faculty, staff, and students certain types of disruptive innovation, and really asking them to take a bite: "Come and join us!" ... I believe disruptive innovation is a healthy thing for any industry because once an industry becomes complacent, it dies. And if you look at the liberal arts colleges that are quickly disappearing from the map of the United States... it's because they have failed to grasp this concept. (LAC04-03)

The other LAC, instead of the contingents of IT, chose to focus on the core DI principles of value proposition and job-to-be-done, and therefore is more strategic. The CFO of this Iowa-based LAC believed that her institution "is responding and incorporating disruptive innovation very intentionally." In one example, the LAC conducted DI on its strategic planning process to increase institutional agility, a prominent job-to-be-done for traditionally slow-paced LACs:

> It was a process that was defined as one that would be alive, evolving, and dynamic. It was not a process where people went away for 18 months, came back with a plan, and then the plan was stationary and on people's shelves or in books and documents. Rather we came forward with a plan that was put together dynamically, with input from trustees, faculty, staff, and students. That plan is alive and well. It is updated annually in the face of a changing landscape. Just as you know the world is changing and we have to be agile in our response or leadership in that role.... So, the key pillars stayed the same, along with the context within which we agreed as well as our long-term strategic objectives. And they match up with the timeline with which individuals would interact with the college, from the very beginning for the prospective students through to the alumni. And then the

> annual tasks and strategic priorities change, and are published, owned, and managed by a shared leadership of a staff member and a faculty member. So that is one way that we are doing this in a very different way. (LAC17-03)

In another example, the LAC is keen on the fact that most of its students would go on to graduate schools. Hence, *excellent prospective graduate students* and *educating them* become respectively the value proposition and the job-to-be-done of the institution. It is worth noting however that this focus may disrupt the traditional value proposition of "full and adaptable persons" (see Figure 14).

> A very high percentage of our students go on to graduate school. Also of our students, a very high percentage of them get into their first choice for graduate school. That's a great thing. But for those students that do not want to go to graduate school, we have introduced three programs that are five years in length, where they will graduate with a combined bachelor's and master's in a specific profession. One is in public health, one is in engineering, and the third has not yet been formally announced. (LAC17-03)

Of the 9 interviewees who indicated that they had not witnessed any change from DI upon LACs, their opinions are also divided. 3 interviewees strongly denounced DI as a concept, all citing MOOC as an example. A CIO of a New Hampshire-based LAC expressed strong rejection to DI, both by way of existing examples and of its original concept:

> I don't believe it has [changed the status quo of LACs]. The unrealized impact of MOOCs has done little to disrupt the status quo of the liberal arts education. Online learning has been a steady change agent but not in a cataclysmic or disruptive way. Clay Christensen's theories have been disproven many times. (LAC10-03)

It is curious that the interviewees tend to associate DI with MOOC, and in many ways, judge the concept of DI based on how MOOC performs (or in some cases underperforms) in the broader context of higher education. When MOOC fails to deliver in proportion to the hypes it received in the earlier years, its credibility and relevancy, along with how DI as a concept is construed, are

called into question. A CFO of a Vermont-based LAC shared his opinion that "MOOC, as an example of disruptive innovation, has very little relevance to liberal education here [at my institution]" (LAC03-03). Such tenacious references to MOOC suggest that not many examples of DI exist, or not many that exist have been brought to light. A CIO of a Connecticut-based LAC echoed this concern in reference to MOOC:

> From my perspective, I'm not seeing a lot of change from disruptive technologies such as MOOCs. I don't actually know of other disruptive technologies, and perhaps you'd like to articulate a few of the others, maybe something that's disruptive that we're reacting to that I'm not aware of. MOOCs were hot for a while, and everybody got scared to death. And now they're hardly a footnote in our daily activities. (LAC16-03)

There are interviewees who do not conceptualize DI based on its association with MOOC or a certain example. Still, DI is believed to not have changed the status quo of the LACs, at least in terms of positive effects or when it is conceived only as a technological intervention. A CFO of a Pennsylvania-based LAC believed that his institution has not been *threatened* by DI yet:

> I would say, very little. I think the pressure on liberal arts colleges has been sort of steady and incremental around the issues of cost and value. I don't see the lifeblood of the institutions, which would be tuition dollars, high quality students, high quality faculty, and philanthropy to be existentially threatened by disruptive innovations elsewhere. You can imagine scenarios in which they could be, but we have not felt that yet. (LAC08-03)

A CAO of a California-based LAC believed that there are perhaps more *disruptions* than *disruptive innovations* in higher education and that technology-driven DI is hard to be found in the context of LAC:

> I think at this point, most of what we see is a continuation of existing models, probably the biggest disruptive innovation that's hit a lot of liberal arts colleges is in the last 20 to 30 years is an increasing reliance on non-tenure track labor for teaching classes. That's not necessarily an innovation that people are all supportive of. I don't see a terrific amount of true disruption, the kinds of innovation that we associate with technology.

> There's a lot of technology used for efficiency gains, there's a lot of technology being used to track information in the hopes that data-driven decisions might be made. So far, I haven't seen anything at this scale in liberal arts college environments that fits a classic Christensen definition of what disruption looks like within an industry. (LAC12-03)

Compared with the 2 interviewees who see DI as a threat to LAC, 2 other interviewees believed that DI could have taken a subtler form of intervention than a classical Christensen version through technology. "It should, but it's actually not." A CFO of a New York-based LAC, who came from the for-profit world as a consultant, believe that:

> The change is happening, and the schools that are getting it are beginning to thrive. It's not just MOOCs. There's so much more to it than that. But it's still too early to say it has changed the status quo. It is just beginning to make an impact.... I actually came from the for-profit world as a consultant... and only recently decided to leave the consulting world to come to a college. Part of that was working with tons of colleges, especially liberal arts colleges, on this very subject. Some of the colleges are getting it, but it's slow going. (LAC02-03)

The other interviewee, a CAO of a California-based LAC, said that "he would love to see more disruptive innovation because the higher education needs it" (LAC18-03). The interviewee also traced the source of potential DI to be one that is other than technology, but one that is "ideological" and "philosophical". In his words,

> What has more affected the universities is the dynamic of an attack from some segments of society, particularly ideological and philosophical that higher education is a private good, not a public good. And the distortion from that standpoint is that as a result universities should not be supported by public dollars. They should be basically put out on their own. That is disrupting higher education much more so than any other disruption through technology or innovation.

In response to these disruptions, particularly one that results in further shortages of funding to higher education, DI should therefore be adopted in a way that it is "absorbed and modified by the culture of institutions" to help counter external disruptions.

The remaining 2 interviewees expressed a sense of security because LACs are either "niche" or "resilient" (LAC01-03) enough to be changed by DI from outside. While not literally stating that LACs as a whole could be a disruptive innovation to the broader context of higher education, a CIO of an Ohio-based LAC shared something suggestive:

> I think it's somewhere between two and four percent of the total students who would go to liberal arts colleges. We're already a niche market, and I don't think that the sorts of new developments in education, like online education and other things like that, are disruptive of what we do. They may be more disruptive of the undergraduate level education that you might get at a very large state university. (LAC07-03)

Of the 4 interviewees who are unsure about whether DI has changed the status quo of the LACs, one believed that the small sizes of LACs may facilitate implementation of DI (LAC13-03); one believed that DI is a source of change to the mindset of people working at LACs (LAC15-03); Two interviewees mentioned the shrinking pool of traditional college-age students in the U.S., but are directed toward different concerns. A CAO of a Missouri-based LAC believed that LACs are not "set up for" the increasing adult students, which is not helped by the political climate favoring education-for-jobs (LAC05-03). The other interviewee, a CIO of an Indiana-based LAC, addressed this issue with a DI perspective that focuses on value propositions and jobs-to-be-done:

> We all think we're different, and we are, but the differences are so nuanced that we have to find clarifying ways in order to embrace what our uniqueness is and capitalize on that. What's your niche? [Disruptive innovation is] forcing us to be creative and think carefully about what our value structure is, and capitalize what our strengths are, so that we can become recognizable to capture that right audience that finds the value in what we're providing. (LAC19-03)

Table 13. Summary of the opinions on the extent of DI changing the status quo of U.S. liberal arts colleges.

To what extent has DI changed the status quo of the LACs in the United States?			
Opinions	N	Sub-Opinions	N
"DI has changed the status quo of the LACs."	7	DI is external and imposing to LACs.	3
		DI can be internal and useful to LACs.	2
		DI is being experimented at some LACs.	2
"DI has not changed the status quo of the LACs."	9	DI examples (e.g., MOOC) are few and underachieving.	3
		There are more disruptions than disruptive innovations.	2
		DI is more than disruptive technology.	2
		LACs as a whole possess certain attributes of DI.	2
"I am not sure."	4	The small size of LAC is facilitative for change.	1
		DI motivates people working at LACs to think differently.	1
		The shrinking pool of traditional college-age students is a potential reason for DI at LACs.	2

4.3.4 The opportunities DI brings to the U.S. liberal arts colleges

The interviewees generally believed that DI brings about a more rigorous discourse on technology in the context of LACs. In their opinion, the technology component should be more student-focused but at the same time maintain peripheral to institutional mission. The interviewees tend to focus on online learning when prompted to talk about disruptive technologies.

The interviewees believed that there are also significant opportunities from DI that are not technology-bound. For many interviewees, DI brings about a change of mind to the LACs, a catalyst that "forces people to think about new things in constructive ways" and "shakes people out of their complacency" (LAC19-04). A CIO of a Connecticut-based LAC added that powerful disruptive technologies encourage thinking into the depths of an educational model:

> [The opportunity is in] the idea that something, a disruptive innovation, might cause us to rethink things. That's the power of it to rethink our principles, our models of providing education, and to revise accordingly. You could say a disruptive technology was the

> World Wide Web back in the 1990s when everything changed, including almost everything we do in a liberal arts college. (LAC16-04)

It is however not an easy change to be made within a cultural context that traditionally undervalues institutional competition. According to a CFO of a New York-based LAC, it is "a shameful thing to say" that a higher education institution should always consider "beating the competition" against its peers, nevertheless DI does help "create competitive advantages" (LAC02-04). A CAO of a Massachusetts-based LAC added that competitive advantages can be built upon the strong individualities of LACs with the help of DI:

> I do think it's college-specific, but there are opportunities there. I think the challenge with it is how you define the brand of each college because, for some colleges, I can imagine their brand is linked to a particular kind of student experience. They might embrace a different kind of student experience or to embrace disruptive technologies that might lead to different kinds of experiences. (LAC15-04)

Compared with those who view the opportunities from DI as individualistic, two interviewees believed that DI brings opportunities to LACs as a holistic sector. A CIO of a Pennsylvania-based LAC believed that LAC, along with its value propositions, is foreign to some countries in the world, and therefore brings opportunities for college branding in an international context:

> I think liberal arts college has the ability to completely embrace disruptive innovation and apply it to the segments and tenets of the core values of liberal arts education. One of our tenets is becoming a global citizen. To bring the concept of disruptive innovation to global citizenship, what we do is we promote our study-abroad programs. By doing that, we basically package up our students who are disruptive innovators and ship them off to other countries. (LAC04-04)

On the other hand, a CAO of a California-based LAC shared something suggesting that some technical aspects of DI (e.g., high-end vs. low-end) provide opportunities for LACs as a whole to

rethink their strategic relations with other higher education institutions, especially in terms of value propositions:

> It's interesting if you go back to the original Christensen's articles and books about what disruptive innovation refers to. It usually refers to innovation at the low-end of a business, not necessarily innovation at the high-end cost intensive aspects of the business. As far as I know there aren't a whole lot of liberal arts colleges, who are looking to differentiate themselves on the lower end. The promise and practice of liberal arts colleges for a long time has been about providing a higher end level of service. Most institutions seem to be doubling down on that and using that as a market differentiator. (LAC12-04)

Another two interviewees believed that the current challenges facing the LACs are actually opportunities for DI to prove its validity through constructive intervention. A CAO of a Kentucky-based LAC believed that DI "would really help them" if it can "solve the cost disease problem" and "ramp up its economies of scale" (LAC14-04). In a similar vein, a CFO of a New York-based LAC believed that it is about "supply and demand". In her opinion, DI is given a brilliant opportunity to engineer "alternative learning models" for LACs to meet the "massively growing demand" from both traditional and non-traditional students, albeit in different ways. On one hand, the high supply of LACs calls for diversification of the model to meet the changing needs of the diminishing traditional students. On the other hand, there needs to be new models to absorb the increasing non-traditional students "who really do want a liberal arts experience". According to this interviewee,

> We have a massively growing adult learning market, adult learners who aren't just looking to get an MBA or an engineering degree to get a job. These people really do want a liberal arts experience, but they are married and have kids. There needs to be ways for them to experience this kind of knowledge and learning, whether it is completely to get a degree or just to expand their own mind or their own value in what they do. There's a demand for it and I think the colleges that can leverage it well will corner the market and be very successful. (LAC02-04)

The interviewees also believed that DI brings about a more rigorous discourse on new modes of change. A CAO of a California-based LAC believed that internally-driven DI is more likely to succeed against challenges such as the dramatically changing student body:

> I see the disruptive innovation that we're most driven by is internal. It's where we respond to new challenges. We've got a dramatically changing student body, for example, more ethnically diverse and more international students. We're responding to that and to the changing enrollment patterns that we have here.... I think the disruptive innovation that I would like to try would be the internally generated responses to new challenges and the changing faculty. We have quite a young faculty here as well as a lot of new faculty members. They take the college in new directions. (LAC01-04)

Two other interviewees believed that DI helps speed up the rhythm at LACs, so that they can "circumvent the long freeze-change-refreeze cycles" (LAC10-04). A CAO of a North Carolina-based LAC believed that the modern-day resilience of LACs increasingly hinges upon being more agile by making more than incremental changes:

> The more we engage in disruptive innovation, the more likely we are to understand how to change on a faster timeline. Much of the changes that we make are very incremental. How do we do more than incremental change in our institutions, and how do we do it in the timeframe that's less than a generation? We don't really have that luxury of being able to have those kinds of incremental generation changes going forward. So, I think those are the greatest opportunities. They're going to make institutions more resilient in the face of change, more agile, and I think long-term, that's better for their value proposition. (LAC20-04)

A total of seven interviewees gave their responses related to the size factor of LACs. The small sizes of campus, class, and even programs are considered synergistic with DI. Two interviewees believed that DI can be experimented more readily at a small college than at a large and complex university. According to a CIO of an Ohio-based LAC, DI provides "the ability to pick smaller projects that are more likely to succeed with limited resources" (LAC13-04). A CIO

of an Ohio-based LAC believed that the size factor also provides flexibility to the strategic growth of departments and programs at LACs. In his words,

> The small college has some level of flexibility in being able to adjust to new ideas and new trends more easily.... For a small institution to add a program like environmental studies [which is not a traditional liberal arts subject], is a much easier proposition if it doesn't involve new buildings or hiring very large numbers of people or restructuring the curriculum. Small colleges can have very small departments and grow those departments based on enrollment much more easily. I would say that the small size of liberal arts colleges gives them some flexibility to address potential innovation. (LAC07-04)

The synergy, which is based on the size factor, can be enhanced by having subject matters or programs that are inherently more tech-savvy. According to a CIO of a Pennsylvania-based LAC, disciplines that can "leverage those kind of disruptive innovations, that can utilize tools like the smartphone and the cloud quickly and effectively" are able to "attract students in a more efficient way" (LAC06-04).

Three interviewees also addressed the importance of partnership, an area strongly influenced by the size factor of LACs. While it has been discussed in a previous section that small size has a toll on the economies of scale of these institutions, resulting in financial problems, it also restrains their social action mission (see Figure 14) if partnership is limited. The interviewees believed that the existing DI examples push LACs to seek more and new forms of partnership, which facilitates the exchange of value propositions between LACs and other entities.

A CAO of a Missouri-based LAC believed that DI brings about opportunities for partnership with corporations and other higher education institutions to "bring [the LAC] perspective into the discussion about what it means to be an educated person" (LAC05-04). A

CFO of an Iowa-based LAC gave a vivid account of how her institution managed to promote their value propositions through an LAC-HEI partnership:

> I think [disruptive innovation] actually brings a lot of opportunities. Constantly we are challenging ourselves to think and deliver our services in new and different ways.... About two years ago, [our college] and [a university] paired up to seek funding from the Mellon Foundation for a project: The role of digital technology in liberal arts teaching. Not only were we awarded the grant, but the Melon Foundation in their wisdom made [our tiny college] the primary administer and manager of the grant. And with a sub-award, [the university] would learn from [our college] that actually had its heartbeat in the center of the liberal arts education. (LAC17-04)

Through partnership, an LAC may also place itself at the receiving end of a foreign value proposition. A CAO of a California-based LAC shared about his adventurous stance toward industry partnership in order to move toward a direction that is more competence-based and industry-focused:

> I think that colleges have an opportunity to move in partnership with manufactures, industry, and employers to develop degrees that meet the needs of industry. We did [our business certificate programs] in a way that would allow for someone to take one class or three classes. And they get a certificate that counts towards a DMBA. But those were designed with industry, with competency.... CISCO already, for example, does certification. Microsoft does certification. There is no reason that universities should not say "We will accept and give academic credit if you have CISCO certification for IT." Universities have to be nimbler. (LAC18-04)

A table is provided below to summarize this section. After being extensively discussed in terms of the strengths and weaknesses of the LACs in the United States, the size factor of LACs has again been focused on when it comes to potential opportunities DI brings to these institutions.

Table 14. Summary of the opinions on the opportunities DI brings to the U.S. Liberal Arts Colleges.

What opportunities does DI bring to LACs in the United States?		
Tech-related	A new discourse on technology	More student-focused Maintain peripheral to institutional mission Online learning

Table 14 continued

Non-tech-related	Change of mind	Building competitive advantages	College-specific Sector-specific
		LAC challenges are opportunities to test DI validity.	Challenge: high cost Challenge: alternative models for changing student demographics
	New modes of change	More internally-driven Faster & shorter cycle	
	Utilizing size factor: small	Small size is innovation-friendly. Small tech-savvy departments & programs	
		Partnership	LAC-HEI LAC-Industry

4.3.5 The threats DI brings to the U.S. liberal arts colleges

The interviewees expressed concerns about the threats that DI may pose to the LACs. These concerns can be categorized into three groups: level of threat, threat from external examples, and threat from internalizing DI.

9 of the 20 interviewees commented on the level of threat from DI. Among them, 2 believed that DI poses little to no threat to the LACs because they are not "relevant" (LAC03-05) to each other; 7 believed that DI poses a genuine threat to the relevance and survival of the LACs with its ability to attack them hard on their traditional weaknesses: high cost, lack of change, and low tech-savviness (see Figure X). According to a CFO of an Indiana-based LAC, "Disruptive innovation will render [the LACs] irrelevant if [they] do not embrace what it has to offer" (LAC11-05). Of the 7 interviewees confirming the threats, 3 believed that high cost is a particular sweet spot for DI threats. According to a CAO of a Missouri-based LAC, the threat level is to the point of "extinction" due to the double decline in student population as well as interest in the liberal arts:

> The major threat would be extinction. I think liberal arts colleges are really challenged at this point to remain viable financially.... I think all of us in liberal arts colleges face that challenge to just keep the doors open because there's so much competition out there. The pool of potential students of college age, 18 to 22, is declining in many parts of the Midwest [where our institution is located]. Students are also more likely to go to a public university or a for-profit/online degree program. The pool of students who are interested in liberal arts colleges is declining. (LAC05-05)

The high cost of LACs is inviting to the discourse of DI from two perspectives: value proposition and political climate in the United States. According to a CIO of an Indiana-based LAC, the lack of expressiveness aggravates the issue of high cost, which weakens the value proposition of LACs even though it is appealing from an educational point of view:

> Private liberal arts colleges tend to be more costly than large public universities, research universities, or community colleges. If we can't find a way to capitalize on our strengths in order to help people understand the value that they are actually getting more for their value than it looks like on the surface... then we'll lose those students, and we won't get enough clientele in order to keep the doors open. I think that's a real threat, and we've begun to see that already. (LAC19-05)

The cost issue can be further aggravated when the political climate is taken into consideration. It goes against the tenet of educational equity, unintentionally setting a bar over students and families who are unable to pay a hefty tuition. According to a CAO of a California-based LAC, high cost is a permeating issue that should not be spearheaded by the LACs:

> We are seeing a great inequality in America. There is a concentration of wealth unheard of in the world.... We have 1 percent, and in fact 1 percent of the 1 percent, who have immense wealth. And the majority of people are right on the verge, one month away from foreclosure, and barely make their rent. And in fact, the debt level is the highest in history. When you have that situation, if there aren't scholarships available, universities will close. I see those as real impending threats to the liberal arts colleges. (LAC18-05)

A second reason for the elevated level of threat from DI is related to another traditional weakness of LACs: lack of change. LACs respond to changes at a much slower pace than DI and its examples, which allows DI to seize the initiative and dictate the discourse of change. According to a CAO of a Kentucky-based LAC, with LACs "being left behind", DI has an opportunity to change the "expectations that students may have of what a [liberal arts] education would provide" (LAC14-05). The absence of an LAC voice is likely to be extended by internal dissent from faculty members over the ways of change, especially one that would involve DI. A CFO of a New York-based LAC shared that her institution has been using disruptive technology to enhance experiential learning experiences. However, the faculty members do not always "budge" to the "sense of urgency" which culminates in the closure of the like of Sweet Briar College (LAC02-05). Tech-savviness, in terms of both technology per se and its innovative deployment, again plays to the strengths of DI rather than the LACs.

Of the 20 interviewees, 5 reflected on the forms of threat from external DI examples. Two interviewees thought that the LACs may need to do more to ensure continuing support from families and philanthropy. While not an existential threat so far, losing them on their side would be a grave situation for the LACs. A CIO of a Massachusetts-based LAC believed that they "need to be changing their program and curriculum mix to ensure that it (losing family support) does not happen" (LAC09-05). A CFO of a Pennsylvania-based LAC shared that:

> I could imagine disruption on the philanthropic side. We see changing attitudes among donors and their expectations for what their dollars will do to the organizations they support. So far, we still have enough philanthropy. It's not an existential threat at all. If there were a new way for wealthy philanthropists to direct their money to the kinds of social change that they're looking for, institutions like this might suffer. We would not enjoy that financial support, which is really foundational to our business model. (LAC08-05)

The CFO also warns that a lot may be on the horizon even if "we haven't seen that yet". Also, ruling out DI on the basis of existing examples, e.g., MOOC, will leave the LACs short-sighted and vulnerable to new examples, especially smaller ones.

> If a student can figure out a way to get into Yale Law School or Harvard Business School or someplace like that without an undergraduate experience like this, if there were some disruptive modes of education that were way less cost-intensive or time-intensive, that would radically shift things. That's not out there yet. People thought maybe MOOCs would do that, but that's not the case so far. It's certainly possible, but we haven't seen that yet.... There are smaller forms of disruptive innovation that you can imagine, like MOOCs, like what would happen to faculty workload or the model of the professor/scholar if all the content is available online. We haven't seen that happen. Technology has been more complementary than a replacement, but that threat is plausible. (LAC08-05)

The other three interviewees believed that the external DI examples have an impact on how people understand higher education. In addition to being "externally- and market-driven" (LAC01-05) as well as "eating away at some of the [student] base that would normally be attracted to higher education" (LAC06-05), DI examples also focus their jobs-to-be-done on *degree* instead of *experience*, of which the latter is the primary differentiator of the LACs. According to a CIO of an Ohio-based LAC, education for degree does not play to the strengths of the LACs:

> If being successful means you have a college degree, then we're able to offer all these other things that look like a college degree. They all say Bachelor of Arts or Bachelor of Science, but they're fundamentally different in terms of experiences and knowledge taught. Why would you go to a liberal arts college if you could get a bachelor's degree in some subject at other places? I think one of the challenges is that we're going to lose the ability to distinguish between different kinds of college degrees. That would be a threat to liberal arts colleges because our degrees are a certain kind and our degrees are fairly expensive to obtain. (LAC07-05)

Of the 20 interviewees, 5 reflected on the threats from internalizing DI. While some LACs rely on "resilience and resistance" (LAC01-05) against external DI examples, others seek to absorb some of the examples or to contextualize DI at the concept level. The interviewees suggest that threats from internalizing DI exist at both college and sector levels. At the college level, three interviewees believed that internalizing DI has potential ramifications for LACs in terms of value proposition. According to a CAO of a Massachusetts-based LAC, LACs may lose their self-identify and traditional market for students from internalizing DI:

> I'm thinking of a relatively small college in Boston that suddenly, because of a partnership with an online provider, now has almost 3,000 students in a couple of their online programs across the world.... They have always been a very much hands-on, on-site college, but now they've got this incredible revenue source, but also, it's really pushed them to the maximum in terms of infrastructure that's needed for something like that. I would say that there may be a new market that opens up because of it, but you certainly might lose some of the previous market in that. (LAC15-05)

A CFO of an Iowa-based LAC shared about her institution whose success is based upon a "singular" commitment to residential experiences (LAC17-05). In her opinion, internalizing DI is an option rather than a mandate depending on a deep and shared understanding of an institution's "core values and services". Anything less than that will subject an LAC to disorientation, causing more harm than good through internalization. By all means, internalizing DI can be a legitimate option, but there is also a threat when one makes heavy sacrifices for minimal returns. According to a CAO of a North Carolina-based LAC, there is a divide between LAC and DI in terms of value proposition when one is long term-oriented and the other is relatively short-term. In her words,

> We think that some of the things our students are exposed to don't add value, but then we realize many years later that they do. So, in order to do disruptive innovation, some things have to give, right? You can't keep everything. So, when you're sacrificing

> something, are you potentially sacrificing something that's deeply important to the long-term process of student and of whole-person formation? How do we make sure we're not doing that? The worry is about those hallmarks of a liberal education that have been so strong for long-term success, how do we preserve those while at the same time creating more space for short-term opportunities? (LAC20-05)

The remaining two interviewees believed that there is a sector-level threat from internalizing DI, albeit from different angles. A CIO of a Pennsylvania-based LAC believed that there is common ground between LAC and DI in terms of value proposition, one that would even make the LAC sector a disruptive innovation to the broader higher education context because the sector itself is a differentiator. Over-reacting to the threats of external DI examples would jeopardize the opportunities for internalizing DI, and is therefore a threat itself:

> If the leadership of the liberal arts colleges does not embrace disruptive innovation, then from my perspective, it begins the countdown for when the college is going to close. And I don't mean to make it so stark and so black and white, but from where I sit as a CIO in higher education, that seems to be the differentiator. I also think that the concept of disruptive innovation fits very neatly into the core mission of liberal arts. I believe with every fiber in my body that liberal arts should be about disruptive innovation. (LAC04-05)

The other interviewee also saw DI opportunities for the LACs as a sector. The difference is that, rather than proactively create differentiators as a sector, the interviewee suggested that DI examples in the broader higher education context (e.g., online learning) has a normalizing effect which is actually differentiating LACs as a sector. In his opinion, internalizing DI would only water down the inherent differentiators of the sector:

> The threat, the kind of existential one, is if someone manages to deliver education in those online environments, that in some sense threatens the model of what liberal arts colleges are all about. In my mind, to the extent that it would happen and continue to happen, it further differentiates liberal arts colleges offering a unique experience, one that's worth the price for people to get it. It's almost as if to say that the disruptions in

higher education as a whole are pointing out the differentiation and value of what liberal arts colleges can provide. (LAC12-05)

Table 15. Summary of the opinions on the threats DI brings to the U.S. Liberal Arts Colleges.

What threats does DI bring to LACs in the United States?		
Theme Group	Opinions	Sub-Opinions
Level of threat	No threat	DI is irrelevant to LAC.
	High threat: LAC relevance & survival	DI exposes LAC weakness: high cost.
		DI exposes LAC weakness: lack of change.
		DI exposes LAC weakness: low tech-savviness.
Threats from external DI examples	Forms of Threat	
	Losing key stakeholders: family & philanthropy	
	Unpredictability of new DI examples	
	Change of higher education: from *experience* to *degree*	
Threats from internalizing DI	Forms of Threat	
	College-level: losing self-identity & traditional market	
	Sector-level: Being over-defensive jeopardizes opportunities for internalizing DI.	
	Sector-level: Over-committing to DI waters down inherent differentiators of LACs.	

4.3.6 The role of DI in institutional innovation of U.S. liberal arts colleges

It is important for this study to also explore how DI may complement the discourse of institutional innovation for the LACs in the Unites States. This importance is perhaps best illustrated in words of a CAO of a North Carolina-based LAC. According to her, DI should be able to make a case for structural changes at the institutional level to facilitate its origination and regularization afterwards:

> How can you make sure you are getting evidence that points to structural changes that may need to happen at the institutional level? So, it's not specific to a course or a group of people, but what does it imply structurally for the institution to be able to make these things happen and to have these successes from disruptive innovation become part of the regular core business in the future? (LAC20-06)

From that perspective, 17 of the 20 interviewees believed that DI has a role to play in institutional innovation of the LACs. Among them, 7 believed that DI "starts a conversation" (LAC09-06, LAC12-06, LAC17-06); 6 reflected upon the types of institutional response; and 5 shared their ideas about the forms of DI at the institutional level.

Of the 7 interviewees who believed that DI started a conversation, a CIO of a Massachusetts-based LAC believed that DI is "not yet driving change" (LAC09-06); a CFO of an Indiana-based LAC believed that DI helps people at LACs realize that "it is critical to integrate technology to the good work [that is done] with students" (LAC11-06). Two interviewees believed that the awareness of DI and its potential is rising in the LAC context. What is up for debate is whether they should go for it and how. A CAO of a Kentucky-based LAC believed that "there is much more room [than technology and online education]" and that "liberal arts colleges have to perceive what value there is in the disruption in furthering their academic missions" (LAC14-06). A CAO of a Missouri-based LAC also confirmed the rising awareness:

> I think all of us pay attention to all these trends that are going on. We're definitely aware of them. It's made us aware of a larger landscape.... I think disruptive innovation plays an important role in helping any institution, not just liberal arts colleges, to evolve and adapt. If we don't evolve and adapt, we will go out of business. I think that the whole disruptive innovation movement within higher education is really a good thing, because it does prompt us to re-examine what we do and why we do it and keep the good things and maybe change some things too. (LAC05-06)

Similar to the opinion that DI is "not yet driving change" (LAC09-06), A CAO of a California-based LAC described DI's role in institutional innovation of LACs as a "foil" (LAC12-06). It is not to the point of fundamental rethinking or responding to a very pressing challenge for his institution. In his words,

> It's about having conversations and talking about what disruption looks like.... It's much more in terms of looking at what other institutions or what outside higher education institutions are doing in terms of disruption and using that to better understand what it is that we are focusing on. (LAC12-06)

Not all conversations materialize into action, but some LACs may have taken further steps. Three interviewees mentioned strategic planning in their reflections. A CIO of a Pennsylvania-based LAC believed that the discourse of disruptive innovation "should be part of the strategic planning" (LAC06-06); Similarly, a CAO of a North Carolina-based LAC shared that she and her colleagues are "most interested in the role that it (or DI) would play [in strategic areas of an institution]" (LAC20-06). The interviewee went on and shared that it is natural to have positive and negative reactions to a trend, especially one from outside academia and particularly from business. It takes a certain "mindset" to react to the trend at the strategic planning level in order to more effectively reap benefits and/or avoid threats. In the words of the interviewee, "how can we structure an institution to make a more positive response to that" (LAC20-06)? On that note, A CFO of an Iowa-based LAC shared that strong leadership and financial resources are key to strategically incorporating DI to the LAC context:

> I think it (or DI) plays a very big role, but it will vary in the way that it is embraced by the institution. And much of that has to do with the leadership of the institution and the resources. Our institution is very blessed. We have both a very forward-thinking, dynamic leader in place and we are also blessed with significant resources. That makes it a responsibility for our school to think up new and different ways of delivering our services. And we are constantly talking about that. It is at the core of almost every senior leadership conversation. And our trustees are onboard as well. It's a challenge for them because many of them like to think back to what our institution was like when they were here. And it's not the same school anymore. (LAC17-06)

Some interviewees also believed that in order to effectively start a conversation, misconceptions about DI must be addressed first. One of the misconceptions is that DI is all

about technology. According to a CAO of a North Carolina-based LAC, DI is more about strategic thinking which is relatively weak in the cultural context of LACs.

> There's a particular misconception that it (or DI) is all about technology. But in reality, it is more about mindset, like how to be goal-oriented and achieve a certain goal within a relatively short timeframe. It's more of an entrepreneurial way of thinking and acting within your institution, but it is not something we're familiar with, broadly. (LAC20-06)

6 of the 20 interviewees reflected upon the types of institutional response to DI. One institutional response is that DI is a panic button. Financially-challenged LACs, which are many, are more likely to gamble on DI or its examples at the expense of educational quality and traditional value propositions. According to a CAO of a Massachusetts-based LAC,

> For colleges that are struggling financially, the choice about what they want to be may not be entirely theirs. If they want to survive, they may have to be much more aggressive, say, with an online college or some online programs. Whether or not those would be successful is another matter, but that may be one example of what they might have to become in order to survive. (LAC15-06)

DI being the last resort is perhaps the worst-case scenario. Compared with the first institutional response, two interviewees believed that while DI is not a mandate for the LACs in terms of institutional innovation, it is however mandatory for the LACs to be more self-reflective and to have a more visible self-assessment mechanism in order to defend "perhaps the best way to educate an 18-year-old freshman" (LAC16-06). According to a CIO of a Connecticut-based LAC, LAC being an excellent educational model is without question. It is rather the business aspect of the model that is in need of institutional innovation.

> Disruptive technology would encourage us to review our practices and potentially change those practices. I don't think that [educational] model itself is now under pressure to change dramatically. I think the challenge is to find the students and to continue to make

> the case that this is, in fact, an important and may be the best way to educate an 18-year-old freshman. (LAC16-06)

A CAO of a California-based LAC reflected upon his 25 years at the institution and warned not to overlook the cultural aspect that is characterized by a resistance not toward institutional innovation per se, but to the manner by which it is handled.

> I would like to think that this place, my college, has taken a lot of innovation. We've completely overhauled our educational requirements and so forth. That came from an internal conversation and a self-analysis. Some of this has to do with assessment and taking assessment more seriously and looking at our own data. This is largely internally generated. It's looking for external saviors and interventionists that I think doesn't work. By the way, I'm saying this as a lifelong employee here. This is my 25th year. I intend to be here until I retire or die. That's kind of a norm. (LAC01-06)

Four interviewees believed that the LACs could take an approach to DI that is more proactive than being self-reflective, which constitutes the third institutional response. The interviewees believed that DI at the institutional level should be leadership-driven and incorporated into strategic planning processes (LAC06-06, LAC17-06, LAC20-06). In particular, a CIO of a Pennsylvania-based LAC believed that the LACs should strategically utilize DI to enhance their social action mission in order to become more visible locally, domestically, and internationally.

> Some of the liberal arts institutions I have worked in talk about being a global citizen and helping the community, but it's more or less talked about within the gilded halls of higher education. I think what we are going to start seeing is it (or the value proposition of LAC with the help of DI) is going to start spreading out to the communities, to the states, and then worldwide. (LAC04-06)

5 of the 20 interviewees shared their ideas about the forms of DI at the institutional level. These ideas tend to focus on how *unbundling* could happen to the business model of LAC. A key

term in the vocabulary of Clayton Christensen's disruptive innovation theory, unbundling allows a product/service to maximize its key values by removing low-impact components. Although this concept is being extensively studied in the higher education context (Craig 2015, Craig and Williams 2015, Horn and Kelly 2015), it is rarely explored in the LAC context and from an insider's perspective. A CIO of an Ohio-based LAC reflected on the business model of LAC and suggested that back office is an area that "DI can certainly help automate" in order to "free up time for faculty, staff, and students [to focus on the liberal arts mission]" (LAC13-06). A CAO of a California-based LAC suggested that unbundling could happen in the form of combined resource pools created by peer LACs in order to save cost for contributing institutions. In his words,

> What I have been doing and what other presidents that I know have been doing is reaching out to counterparts to create combined resource pools. For example, why do we all spend money on databases or on learning management systems? Why don't we work together to combine resources for those very systems? Often, we have developed common degrees or programs. Why not do it instead with a close-by university that has seats available in their doctoral program or master's program? Universities are going to say "We have to be disruptive. We have to think creatively." and figure out ways that we can expand our market and increase our quality while reducing cost. I think if we don't do that some of those institutions will not be around two or three years from now. (LAC18-06)

The participants tend to refer to online education as a familiar DI example. The example is often considered a threat and attracts debate on whether it can be incorporated into the business model of LAC. Two interviewees suggested that online education should be unbundled not in the sense of being removed, but in the sense of being separated from the core liberal arts activities so that, rather than "deliver to your core", it brings "new opportunities, new ideas, and new innovation out into the community" (LAC02-06). According to a CFO of a New York-based LAC,

> It can be a traditional liberal arts college and at the same time offer a very robust online adult learning experience. That doesn't even have to be degrees. It could be certificates. I have worked with this university for a while and one of the things they do is a course called the History of Black Minstrel Music in the US. They charge $1,200 for taking that course. It is an online class and had 45 people sign up on the first day it opened up. (LAC02-06)

Rather than *unbundling*, it seems more of a *re-bundling* experimentation on the business model of LAC. Similarly, a CAO of a Massachusetts-based LAC reflected upon a new program being added to the institution and suggested that re-bundling non-traditional programs allows his institution to absorb segments of the growing professional education market. Also, financially-challenged LACs are more likely to resort to this differentiating strategy.

> I know that adding new programs isn't necessarily a disruptive innovation, but it could be for some institutions that have not thought about those kinds of programs. At our institution, we are giving some thought right now to a nursing program. We don't have a lot of strength there, but we also know that the market is very strong right now. Are there ways we might do something innovative that would attract students and not break the bank in doing it? (LAC15-06)

It is important to see that both unbundling and re-bundling strategies are likely to have strong implications on the small size factor of LAC, a contributing factor to the value proposition of residentiality (see Figure 14). An LAC would become smaller or larger in terms of institutional and/or class size depending on specific unbundling or re-bundling strategies. For example, an online class is likely to have many more enrolled students, which disrupts LAC from not only a mode-of-delivery perspective, but also a perspective of sheer size! A class of 45 is a different magnitude than a class of 7. It brings to the point that the size factor, often contingent on circumstances including mode of delivery, could be an overlooked leverage of differentiation and/or strategic decisions.

Compared with the 17 interviewees who believed that DI has a role to play in institutional innovation of the LACs, 3 of the 20 interviewees disagreed from the respective angles of track record, measurement, and entry barrier. A CIO of a New Hampshire-based LAC believed that DI has no proven examples to concern the LACs at the strategic level. A CIO of an Ohio-based LAC believed that strategically incorporating DI is difficult and risky, because it is difficult to tell if it would bring more value due to lower measurability of (liberal arts) education than of commercial products.

> I think education's value is much more complicated and much harder to measure in the short term. How do you know if you've gotten a good undergraduate education? Do you know right after the course is over? Do you know when you graduate? Do you know five years after you graduated or ten years after you graduated? One of the things we see is that people come to appreciate what they learned at a school like ours many years after they were at the institution. So, if value is very difficult to determine, then it's very difficult to determine if something that's disruptive actually has more value. (LAC07-06)

A CFO of a Pennsylvania-based LAC believed that the small market of LAC favors risk-aversion and quickly exposes and prevents any innovation from being disruptive. As a result, it creates a high entry barrier for DI coming from both inside and outside as "the sector quickly globs onto things that work" with "the same set of schools just holding their market share" (LAC08-06).

Table 16. Summary of the opinions on the role of DI in institutional innovation of U.S. Liberal Arts Colleges.

What role does DI play in institutional innovation of the LACs in the United States?	
Role	Opinion
Starts a conversation on DI	A growing awareness of DI A need to further integrate technology A need to include DI in strategic planning Misconception: DI is just technology or online education.
Prompts three institutional responses	DI is a panic button for financially-challenged LACs. DI calls for more rigorous self-reflection and self-assessment. DI should be included in strategic planning.
Offers a strategy of unbundling/re-bundling	Unbundle: Automate Back-office operations Unbundle: Combine resource pools with peer LACs Unbundle/Re-bundle: Online programs Unbundle/Re-bundle: Non-traditional programs, e.g., nursing
No legitimate role due to...	No proven examples Low measurability of (liberal arts) education High entry barrier due to small market of LAC

4.3.7 Existing examples of DI in U.S. liberal arts colleges and three case studies

The interviewees were asked to share about one disruptive innovation at their institutions. Of the 20 interviewees, 13 indicated that his/her institution has an innovation that is disruptive to a certain area of the institution, with only 4 suggesting some variants of online education. It is worth noting that the examples may not be *sufficiently* or *equally* disruptive according to Clayton Christensen's strict definition of DI. However, each of them represents a variant that is considered sufficiently disruptive to the specific institution and/or the LAC sector. According to the interviewees, most of them are either first ever tried in the history of the institution or unheard of among peer institutions. The 13 examples are presented in the following table focusing on the *job-to-be-done* component of the 3+1 DI model (see Figure 6). This section then presents case studies on 3 examples (with asterisk) that more closely match the tenets of DI.

Table 17. Summary of the DI Examples from the 19 LACs.

DI Example	***Job-to-be-done***	***Disruption***
Laboratory testing services*	Generate revenue	Multipurpose college laboratory
Adult degree	Generate revenue	First attempt on adult education
LAC-CC bachelor's program*	Save cost	Disruptive transfer schemes
Business process redesign	Save cost	Replace paper with web forms
Digital Learning R&D*	Agility	R&D in liberal arts colleges
Blended summer semester	Agility	Summer semester as a DI incubator
Short-term strategic planning	Agility	Ongoing: revisited annually and quarterly on an interim basis
General education component for 21th century LAC	EL: Curriculum	Overhauled 4-year general education component
Program liaison entity	EL: Curriculum	Break down walls between traditionally strong programs
Social learning library	EL: Interaction	Interact with people, not just books
Online MEd	Service active teachers	Entirely online master's program
Ubiquitous campus wireless	Residentiality	Web-based connection
24-hour campus accessibility	Residentiality	Connection beyond class hours

These examples are the first coming to mind of the interviewees. Although some admitted that his/her example is more evolutionary than disruptive, others stressed that it is very disruptive to a certain area of the institution. It is worth noting that 7 of the 13 examples focus on the *finance* or *agility* jobs-to-be-done, two traditionally weak areas of LACs, 5 focus on the traditionally strong areas in *experiential learning (EL)* or *residentiality*. It gives an impression that the examples falling in the finance or agility category are more disruptive than those falling in the EL or residentiality category. The 3 case studies are on examples falling in the finance or agility category.

Case Study 1: Laboratory Testing Services – Center for Craft Food and Beverage

Established in 1928, LAC02 is a rural New York State-based 4-year liberal arts college enrolling some 1,329 full-time students. The institution has 187 faculty members, which contributes to a 10:1 student to faculty ratio as well as an average class size of 16. 77 percent of the students live in college on-campus housing. The college currently offers degree programs in 35 majors from which 25 are open to minors. The total cost for full-time matriculated students in 2017-2018 is $56,627, including $43,312 in tuition. The college currently has an innovative 3-year bachelor's degree program which saves a year of tuition for some 94 qualified students, a 7 percent of the total students in 2017. In addition, the college offers a variety of financial aid packages, including sibling- and legacy-based tuition discount and grants.

DI Unit: Multipurpose College Laboratory. The Center for Craft Food and Beverage (CCFB) is a resource for testing, business development, and education that supports small and mid-sized breweries, malt houses, farms, and other craft food and beverage producers. CCFB provides four service categories, including product quality and improvement testing services, professional

development training and education, business development services, and research collaborations. Under the category of product quality and improvement testing services, CCFB provides services for three agricultural products in barley, malt, and beer. There are 5 types of services for testing barley quality, 4 for malt quality, and 5 for beer quality. Each service charges a fee per sample ranging from a minimum of $15 to a maximum of $150. For example, a beer quality testing on alcohol is $15 per sample while a "full malt analysis" is $150 per sample. Additional discounts and subscription-based pricing is available for large annual sample volumes. CCFB's educational component consists of professional development programs in the form of a week-long course on craft malting technology as well as research collaborations involving students, faculty, and master brewers focused on the biochemistry of brewing.

Job-to-be-done & Disruption. Liberal arts colleges in the United States have a traditional weakness in high cost. While many have been trying to contain cost, some even at the expense of educational quality, LAC02 chose a very different and innovative approach. According to the CFO, "It didn't lower cost. It generated revenue" (LAC02-13). Opened in 2016, CCFB is New York State's first and only brewing industry resource for testing, education, and business development. Upon a $250,000 legislative grant, CCFB disrupts the notion of a college lab by being a hub for both education and business development. In addition to generating revenue for the college, CCFB also services the jobs-to-be-done for students and local businesses. The CFO indicated that the disruptive lab model helps local businesses without lab facilities to run testing machines for a price:

> The company that manufactured this state-of-the-art machine decided not to do the testing themselves. They wanted to try a model where they would have labs that would do the testing. They would deploy their machines into your lab, and you buy the kits. So, it's really the consumables that they make the money. We buy the kits, run the tests, and

> bill the client. There's a profit margin built in there so that we can pay for the kits and make a profit. So, we're generating profit, new revenue. (LAC02-13)

This also allows students to operate on the "state-of-the-art machines" on campus, which enhances their experiential learning by facilitating the development of practical and business planning skills.

> It's our students getting to use this technology.... [The professor] will schedule a time for her kids to work in the lab on the samples that are from the actual client. So, they'll get trained in how to do it, and then they're doing the work. It is part of their course credit, but it's also working on a client's actual sample. That's the disruptive technology, and a new way of delivering education, and making new money. It didn't save us money, but it didn't have to. It's making us money. (LAC02-13)

There is also an enabling technology in this disruptive lab model. According to the CFO, this disruptive technology "completely elevated the delivery of our biochemistry fields."

> It has the capability of testing 16 beer samples at once.... It has completely elevated the delivery of our biochemistry fields. In fact, one of the professors used to do what this machine did by hand, one sample at a time. Now she teaches her entire class do one or two by hand, then teaches them how to use a machine which is all computer programmed, because that's the kind of technology they're going to use when they go and work for the large organizations that have these kinds of machines. (LAC02-13)

Summary. This case study represents a tech-driven corporate partnership model that disrupts the conventional notion of a college laboratory. Above all, it generates revenue for the college, enhances experiential learning for the students, and saves resources for the corporate partners. It also enjoys a certain degree of non-competition since it is the first and only example in New York State. Still, it is a new model given that CCFB did not exist until 2016, but it will attract meaningful attention as it develops and matures.

Case Study 2: Disruptive Transfer Schemes – The Bridge Program & The 3+1 Pathway Program

Established in 1977, LAC18 became an independent urban campus in 2007 of a now 7-satellite university system whose historic roots date back to 1852. At its peak, over 35 satellite campuses were founded across the country during 1964-1977 to serve adult learners, of which LAC18 is the last coming out of this wave. The university system is unified under a "One University" motto to promote innovative undergraduate and graduate degree programming responsive to the needs of adult learners. With a mission grounded in social, economic, and environmental justice, it is home to the first woman faculty member equal to her male counterpart as well as the first co-op program in a U.S. liberal arts college. It is also home to the nation's earliest adult campuses, of which LAC18 is one example.

Located at the central coast of California, LAC18 has an enrollment of 369 students, divided between 136 undergraduate and 233 graduate students. 224 of the 369 enrolled students are full-time. The institution serves the adult learners with a clear recognition that "it is not possible to put life on hold while one goes back to school." Accordingly, the institution offers personalized course structure and low residency programs so that adult learners "will be able to find a degree that fits their busy schedules and gives them the learning outcomes they need to succeed." To do so, LAC18 offers a combination of degree and non-degree programs, including 4 bachelor's programs, 4 master's programs, 3 master's programs with teaching credentials, 1 doctoral program, 3 stand-alone teaching credential programs, and 3 certificate programs. These programs cover 4 disciplinary areas, including education, psychology, communication, and management. Tuition for degree programs is charged on a per-quarter-unit or per-semester-unit basis, allowing adult learners the flexibility to decide on the number of quarter/semester units for

an academic year. For example, the per-quarter-unit tuition for the MA Education Program is $621 in 2016-2017, allowing adult learners to choose between a tuition of $3,723 or $6,207 based on the number of enrolled quarter units. Accordingly, LAC18 offers a wealth of scholarship and grant opportunities to help adult learners fund their education.

DI Unit: Disruptive Transfer Scheme. It does little justice to this disruptive innovation focusing only on one campus of the vast university system, because at least two campuses adopt this scheme with notable variances. LAC18 adopts a transfer scheme to allow adult learners to earn their bachelor's degree with transfer credits from a community college. This scheme, called the Bridge Program or the 80/40 program, is designed for adult learners with 60 transferable semester units of credit at a community college. Once admitted to LAC18, the adult learner completes an additional 20 credits at the community college before taking the final 40 credits of upper-division courses from LAC18 to take a Bachelor of Liberal Studies. The degree program is offered in the following areas of emphasis: business, communication, creative writing, liberal studies, psychology, social services administration, human services, and child, family & society. Adult learners can enjoy the flexibility of full-time or part-time enrollment. Because only 40 credits (or one-third of the total credits) are paid at an LAC tuition level, this program is more cost-competitive than the traditional 2+2 transfer plans involving UC or CSU institutions in the California context. The program is currently underway with 6 community colleges.

This disruptive transfer scheme has a variant at LAC18's sister campus in Ohio. In 2014-2015, this campus was recognized by *U.S. News and World Report* as the top institution based on the percentage of students, age 25 or older, enrolled in undergraduate programs. Designed for the busy adult learners, the 3+1 Pathway Program also disrupts the traditional 2+2 transfer model by allowing community college students with certain associate's degrees to spend only one year at

the LAC18's sister campus before getting their bachelor's degree. This transfer scheme saves cost in the range of $11,000-13,000 compared with the traditional 2+2 model and facilitates a seamless pathway for community college students to go on and earn a bachelor's degree. The program has been launched with 3 community colleges in Ohio since 2016, and is the only 3+1 model in the state so far.

Job-to-be-done & Disruption. The massive adult learning market is hard to neglect for the liberal arts colleges despite their traditional focus on the 18-22 year olds. Compared with some LACs that hesitate to move toward this new market, LAC18 already has a 40-year history of adult education knowing that *adult learners also want liberal arts education*. By focusing on this job-to-be-done, the 80/40 and the 3+1 transfer schemes disrupt the traditional 2+2 model and facilitate a pathway not only for adult learners toward a more affordable liberal arts education and/or degree, but also for LAC18 toward a stronger financial state through improved enrollment from community colleges. An interview with the CAO reveals that LAC18's leadership has a proactive approach to disruptive innovation:

> I would love to see more disruption because the higher education needs it. I have been involved with disruption both inside and outside of higher education, through the development of micro-degrees and certificates as well as taking the approach of developing education in bits that can be taken at any point in time. That [or the 3+1 transfer scheme] has been disruptive, and it has lowered the cost of education. (LAC18-13)

Before joining LAC18, the CAO has been involved in developing the largest MBA based on competencies and stackable certificates in a southern city, a disruptive innovation shared in detail during the interview.

Summary. This case study represents two similar transfer schemes that disrupt the traditional 2+2 transfer model. On one hand, it facilitates the pathway for adult learners toward a more

affordable liberal arts education and/or degree. On the other hand, it enhances the financial state of the LAC through an improved source of enrollment. The 3+1 Pathway Program also enjoys a certain degree of non-competition since it is the only 3+1 example in Ohio by 2017.

Case Study 3: Value-Added Liberal Arts College – Digital Learning R&D

Established in 1837, LAC20 is a North Carolina-based liberal arts college with a strong Presbyterian heritage. “Having chosen to be a liberal arts college”, the institution prepares students for lives of leadership and service with humane instincts as well as a disciplined and creative mind. One of the strongest and most selective LACs in the country, LAC20 is the first liberal arts college to eliminate loans in financial aid packages. The institution has 1,950 enrolled students and 179 full-time faculty members, which contributes to a 10:1 student to faculty ratio as well as an average class size of 15. 93 percent of the students live on campus. The institution currently offers degree programs in 26 majors and 17 minors. In 2017-2018, the total cost for full-time matriculated students is $63,903, including $49,949 in tuition. LAC20 meets 100 percent of the calculated financial need entirely through grants and student employment, with no financial aid packages including a loan component. 51 percent of the students receive need-based aid. The institution has an endowment of $697.2 million by the end of 2016.

DI Unit: Digital Learning R&D. The Digital Learning R&D (DLRD) initiative represents an institutional R&D strategy to “adapt and respond to disruptive innovation”. Charged with a mission to “reimagine the liberal arts”, it allows students, faculty, and alumni from LAC20 to design credit bearing projects that experiment with new models of learning. DLRD is under the auspices of close collaboration among 4 institutional entities, including Digital Innovation, Innovation & Entrepreneurship, Center for Interdisciplinary Studies, and Digital Studies. DLRD welcomes proposals for funded credit bearing projects following a 4-step protocol. In the first

step, R&D proposal starts with a story and idea for change (see Table 18); In the second step, DLRD guides the proposal through a design process; In the third step, DLRD provides credit bearing space and partnership to launch the project; In the final step, DLRD provides assessment of the project using a cognitive analysis tool called Sensemaker. DLRD currently has no fewer than three active projects.

Sample R&D Credit Bearing Project – DevBootCamp. DevBootCamp is a credit bearing partnership project with a coding boot camp from San Francisco. It originated from students and alumni with a goal of trying to understand how coding boot camps, or coding in general, could add value to a liberal arts experience and vice versa.

Table 18. Sample Ideas of DLRD Proposals at LAC20.

Sample Ideas of DLRD Proposals at LAC20	
As a student...	"I want the time and space to explore an issue holistically, in a course designed and led by students." "I want to design and build products or services that provide value to others."
As a faculty members...	"I want to give students more ability to regulate the pace of their own learning." "I want to break down the classroom walls and create immersive, place-based learning opportunities."
As an alumnus...	"I want to help students demonstrate what they can do with what they know." "I want to help students translate the value of the liberal arts to their next stage in life."

Rather than teach coding in a classroom context, it prepares students for a startup and entrepreneurial mindset on their way to become an entry-level coder after a period of 18 weeks. "That's just not something we do in the curriculum at all." According to the Director of Digital Innovation at LAC20, a vocal advocate for R&D in the LAC context,

> That was a very different way of thinking about how to get those technology skills in a different way of learning. It is almost like language learning which we value in an

> immersive way. We wanted to see how that might play out for technology skills. Is there a place for immersive learning in coding and technology? (LAC20-13)

To answer that question, DLRD helped launch and support the first ever study-away at LAC20 which is a key component of DevBootCamp. DLRD assigned a 4-credit space for DevBootCamp and supported it with funding from multiple sources, including outside donor, study-away funds, and paid internships. The 4-credit program is divided into two phases. In the first phase, students stay at LAC20 and connect with DevBootCamp mentors based in San Francisco; In the second phase, students travel to San Francisco to complete the on-site requirements. Both phases utilize online technology to help students connect respectively with their DevBootCamp mentors and faculty members from LAC20. Over the course of the program, students can write memos or reflections on their progress and keep them accessible to the public at DLRD's website.

To further answer that question, DevBootCamp also gives thought to the diversity of participating students. According to the Director of Digital Innovation at LAC20, DevBootCamp particularly encourages female students and students of color to participate in the credit bearing project:

> We want our students of color and female students to have first stab at participating in this program because there is a lack of women and minorities in the technology field. We want to understand how we could expose more women and minorities to technology, but do it in a way that doesn't cost them too much money, that is accessible, and that we can evaluate in close partnership with someone who offers something we can't do on campus. (LAC20-13)

Job-to-be-done & Disruption. Liberal arts colleges in the United States have a traditional weakness in low institutional agility, which is easily magnified by disruptive innovation and its examples. While some LACs are forced to turn to online education as a way out of financial constraints, LAC20 proactively adopted the tool to explore new boundaries of a liberal arts

education so that “the college maintains a position of strength in adapting and responding strategically to disruptive innovation”. Asking students, faculty, and alumni the question of “What is missing in the liberal arts experience at this college?” is an invitation for disruption, and answering it with credit bearing R&D is a disruptive innovation put into practice in the LAC context.

Summary. This case study represents a credit bearing R&D initiative that strives to mingle and maximize the strengths of a traditional liberal arts education and disruptive online technology. It is one of few, if not the only, institutional R&D initiative charged with the mission of reimagining the liberal arts with technology. Given that the earliest credit bearing R&D project at LAC20 dates back to only 2015, it leaves a lot to look forward to as the initiative moves forward.

5.0 DISCUSSIONS, CONCLUSIONS, AND FURTHER THOUGHTS

Now let's sit back and go to the beginning of this study: What is going on with the liberal arts colleges in the United States? The difficulty in answering this question lies first and foremost in the two "unknowns".

First, there are huge chronological gaps between empirical studies focusing on the problems of LACs, especially when there are very few empirical studies since David W. Breneman's study (1990), titled "Are we Losing Our Liberal Arts Colleges?" However, there is a thin line linking Breneman's study to a revisiting study by Vicki L. Baker and her colleagues (2012), which serves to confirm a point that LACs have continued a trend away from their historical focus on arts and sciences disciplines. Nevertheless, the 2012 study admittedly left an unanswered question all the way prior to this study: Are LACs redefining themselves in the 21st century? There is a huge "unknown" since then from an empirical study point of view.

Second, it is unknown as to what a proper perspective/tool to study the problems of liberal arts colleges is. Both the 1990 and the 2012 studies utilized the Carnegie Classification framework for targeting often the elusive concept of LAC, an approach inherited by this study for good reasons. Moving beyond that, however, there is a much less consensus on a consolidated discourse and/or approach by which the inquiry could easily progress further.

It is to answer to these two "unknowns" that the author places this study in a strategic position mixed with logic and ingenuity. It is logical to respond to the 2012 study, extend the

inquiry on the problems of LACs, and shorten the chronological gaps between empirical studies by doing a study like this; It is ingenious to adopt a perspective/tool in disruptive innovation to study the problems of LACs, because LAC and DI are more conceptually distant to each other than they really are. Liberal arts colleges utilize online learning. For those that don't, they have reasons we often don't know due to a lack of empirical studies, just like those that do. LAC and DI are reaching for each other for reasons and in patterns that we need to know more about. Even from a conceptual point of view, there is an alienation of DI due to misconceptions, which is unnecessary. DI is more than technology and therefore has more shaping power than technology. However, as a theory, DI is under-developed, under-represented, and under-contextualized. If LACs and DI are next door to each other in a context of rapid technological advancements, changing student demographics, and increased financial constraints, which they are, then it takes less than ingenuity to place both under one microscope.

Answering to these two "unknowns", which is a main contribution of this study from an advocacy perspective, is guided by three research questions focusing respectively on 1. awareness of DI at LACs, 2. problems of LACs revealed using the framework of DI, and 3. challenges and opportunities of adopting DI in the LAC context. The ingenuity of adopting DI as a framework for dialogue with LAC insiders (or the CAOs, CIOs, and CFOs in this study) runs a huge risk of low awareness of DI in the LAC context. Since the inquiry followed a pyramid-shaped structure (see Figure 5) where awareness lays the foundation for the conceptualization, example, and reflection components of the inquiry, low awareness of DI would have prematurely terminated the study. Fortunately, this is not the case. 79 percent of the 128 survey participants indicated that they are familiar with the concept of DI, with 42 percent being very familiar with the concept. This level of awareness is robust for deeper inquiries in the domains of

conceptualization, example, and reflection, but it also cautions against confidence that participants are all on the same page as to what a disruptive innovation exactly looks like in the LAC context other than the obvious example of online learning. Some participants needed an example to work with the concept or risk wandering off to confusing DI with an actual piece of technology, e.g. online learning. These participants may find it difficult to proceed to the latter stages of conceptualization, example, and reflection, and therefore might either cease participation midway in the online survey or produce answers that are untoward. Other participants can work with the concept of DI without drawing upon a specific piece of technology and would therefore ease through the latter stages of the inquiry. The confusion between DI and an actual piece of technology, particularly online learning, was more persistent in some individual cases than others. The point is, confusion between DI as a concept and DI as an actual piece of technology was manifest in the both survey and interview stages of the inquiry, which is one of the main findings of this study. On the other hand, it is a potential weakness of this study due to this confusion. It is recommended that future studies on disruptive innovation be very wary about its definition.

5.1 CAOS, CIOS & CFOS

Inviting senior administrators to participate in this study is proved to be a wise choice. The senior administrators offer a strategic view with unique perspectives based on their administrative roles, which serves the topic well. Still, it is recommended that future studies on this topic include a broader scope of LAC stakeholders, including students and faculty as well as alumni and parents considering LACs are very legacy-based. An unexpected finding is that not

every sample LAC has a dedicated equivalent of CIO and/or CFO. Some LACs only began to have their first CIO and/or CFO within the past 5 years. This is strongly felt when the author was collecting contact information for the 225 sample LACs and is part of the reason why there are only 576 accessible individual participants instead of 675 (225*3). This is important because it raises two questions: Why did the LACs begin to set up the dedicated positions and where did the new people come from? This study is not ready to fully answer these questions, but it is clear that some of those people come from external background, including several interviewees who are proponents of and have experience in disruptive innovation. This is likely part of the reason why the CIOs and CFOs differed noticeably from the CAOs in opinions about DI. At this point, the author wants to suggest that since disruptive innovation has its roots in technology and business practices, the incoming CIOs and/or CFOs are likely to facilitate the experimentation on DI in the LAC context. This points to a potential direction for future studies.

5.2 DISRUPTIVE INNOVATION & LIBERAL ARTS COLLEGES

How does it look like when they are placed beside each other? It's audacious and revealing. To quote a CIO of a Pennsylvania-based LAC,

> It's a great study. You're hitting the nail right on the head with what's going on with liberal arts education. Everybody else is kind of dancing around the subject matter. A lot of people within liberal arts are afraid to ask these questions. So, I applaud you on having the guts to do this and I would really love to get the results because I would like to share the results. (LAC04-14)

In general, the results show that the senior administrators have a strong awareness of and a moderately positive attitude toward the concept of disruptive innovation. The senior

administrators also strongly agreed on two points, that 1. LACs are distinctly different from other HEIs, and that 2. Technology is increasingly important in advancing the mission of LACs. In correspondence with point 1, only half as many participants believed that LACs are distinctly different from each other than they are from other HEIs. However, this does not mean that the LACs are very similar to each other or such is a trend. Some LACs are vastly different from others due to tradition or disruptive innovation. For example, LAC18 (the second case study LAC) focuses on liberal arts education for adult learners, has a much shorter history, and adopts a disruptive transfer scheme which further differentiates itself from other LACs. It suggests that the Carnegie Classification on liberal arts colleges may not be the only legitimate framework for sampling this type of institutions. A CFO of a Pennsylvania-based LAC drew upon Robert Zemsky and colleagues (2001)' work on competitive enterprise of higher education and suggested that market segmentation is an alternative lens to institutional type for studying the liberal arts colleges. According to her,

> It would be a way of understanding why some liberal arts colleges are thriving, others are going out of business. They're actually not competing against each other. They're not in the same worlds, really. Some liberal arts colleges are competing against universities. There are other liberal arts colleges that are very local that serve nearby communities. They're probably competing against community colleges and other sort of convenience institutions. It's a way of seeing how those trends [including disruptive innovation] within one sector can be going in different directions. (LAC08-14)

A second factor that differentiates LACs from each other is year of establishment. The vision and rhetoric for reimagining the liberal arts may be more pleasant to the ears of young LACs to those that are much older and traditional, more so when it comes to disruptive innovation. A CAO of a California-based LAC drew upon the example of "Hippie" Colleges and suggested that

disruptive innovation will be very differently received by and mean very different things to start-up LACs than to those that are more established. In his words,

> I am very interested in the so-called start-up institutions. There is this interesting development now of the U.S. liberal arts college model going global. I've had an opportunity to work lately with Quest University Canada as well as Habib University in Karachi, Pakistan. There are also some liberal arts colleges in Europe. These are new start-up entities as ours is. We are kind of middle-aged now. So, what would you do if you had the opportunity to reinvent the liberal arts college? What would you dump? What would you avoid doing? (LAC01-14)

Both the market segmentation and the start-up lenses suggest that the LACs are more differentiated from each other than they look like, by which it is recommended that future studies focus on a certain subset of the liberal arts colleges.

5.3 "LIBERAL ARTS"

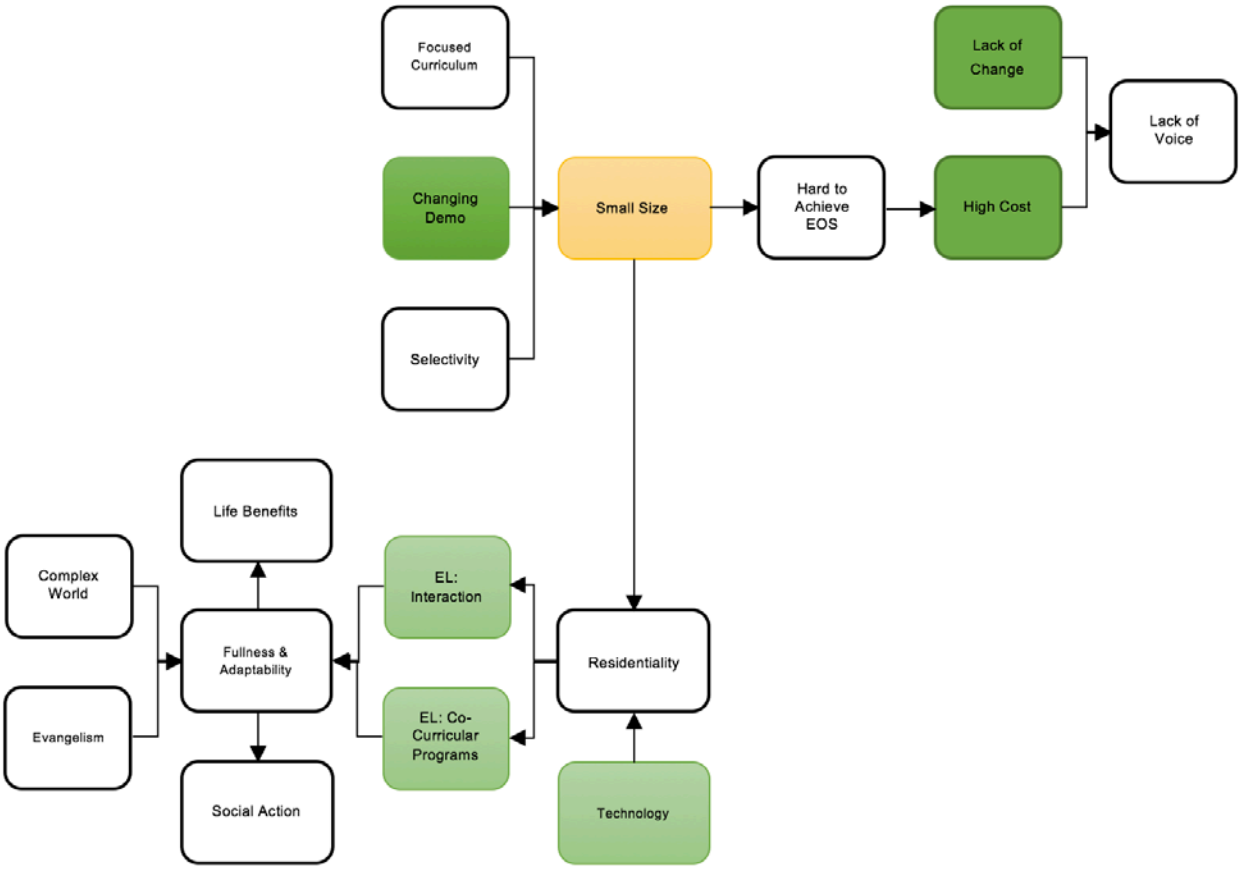
The second research question asks about the problems of LACs revealed using the framework of DI. By "framework of DI", this study essentially utilized a serviceable 3+1 DI model based on the classic theory of disruptive innovation. The merit for using this model is that it allows the inquiry to focus on the values and needs of LACs from the lens of *new value*, *new need*, and *new model*, three terms paraphrased respectively from the DI tenets of *non-competition*, *job-to-be-done*, and *unbundling*. The results have been sufficiently discussed and summarized in the analysis section. However, it is worth mentioning again that the concept of *liberal arts* is unexpectedly not as potent as some of the more tangible aspects of LACs, such as *residentiality* and *small size*. From the perspective of the senior administrators, *liberal arts* was consistently rated below other aspects of an LAC in terms of importance to a successful LAC, institutional

commitment received, and contribution to institutional mission. *Residentiality* and *small size* are ahead of *liberal arts* in all of the three categories. In the category of importance to a successful LAC, *liberal arts* is even behind a number of other aspects of an LAC! The finding is consistent when we look at the main reasons that attract students and faculty to a specific LAC. Again, *liberal arts* is behind a number of other aspects of an LAC. The findings clearly showed that *residentiality* and *small size* are the predominant trademarks of LACs, but they also point to a need for clarification on the concept of liberal arts, which potentially responds to the expressed concern in low public sound bites for LACs. Breneman (1990)'s findings were confirmed by Baker and colleagues (2012) 22 years later that *liberal arts* was "unbundled" from some liberal arts colleges according to their adjusted Carnegie Classification categories. At this point, it is safe to say that this is likely the case.

5.4 SCALING A GREAT EDUCATIONAL MODEL

This is very much related to the third research question, which is about the challenges and opportunities for adopting DI in the LAC context. In a nutshell, the opportunity is that LAC is always a great educational model; the challenge is scaling that model. Based on the 20 in-depth interviews with senior administrators from 19 LACs across the country, there is no reason to change the educational side of the model, but there is every reason to change the business side of the model! One of the main contributions of this study is that it produced an SWOT mind map of LACs according to the combined perspective of the senior administrators (see Figure 16). An arrowed direction in the map indicates a facilitative relationship. This mind map helps locate challenges and opportunities and is adaptable as new situations arise.

Figure 16. The SWOT Mind Map of the U.S. Liberal Arts Colleges.



According to this mind map, *small size*, which is a contributor to *residentiality*, is also a main reason why it is difficult for LACs to achieve *economies of scale (EOS)*. As a result, LACs have to charge *very high tuition*, which, coupled with the factor of *low agility*, leads to a *lack of voice* as well as low public approval. There are factors which contribute to the small sizes of LACs, including the decreased percentage of college-aged students. Notice that, in the mind map, *small size* is surrounded by shaded domains with which the 13 shared examples of innovation are associated. Half of the examples are related to *cost* and *agility*, including all of the 3 case study examples of disruptive innovation (shaded in deeper green).

The mind map helped illustrate a very important point: Since residentiality is so important to the educational model of LACs, scaling this model should not be about indefinitely increasing the sizes of LACs. Rather, it should be about increasing the sizes to a point that EOS can be achieved OR using alternative measures that can offset the negative impact from the small size factor. The data suggested that both approaches are being explored in the LAC context. On one hand, some LACs created new programs, which effectively increased enrollment and achieved a certain degree of EOS. On the other hand, some LACs created partnership initiatives, which maintained their small sizes and achieved scaling results nonetheless. All of the 3 case study examples of disruptive innovation are partnership-related, including one with a craft brewing company, one with community colleges, and one with a coding bootcamp. At this point, it is safe to say that partnerships provide opportunities for the LACs to experiment on DI. For LACs that aggressively increase enrollment with or without disruptive technologies such as online learning, there is a bigger challenge in maintaining educational quality as well as the integrity of residentiality.

5.5 ON DISRUPTIVE INNOVATION AS A STRATEGIC TOOL

The dialogues with higher education leaders in the liberal arts sector reaffirmed a trend that disruptive innovation, as a concept, is becoming a strategic option, or at minimum a change agent that requires strategic attention. When building a case for strategic leadership, Stewart E. Sutin and W. James Jacob (2016) emphasized six core values for contemporary higher education leaders, where they distinctively included disruptive innovation in the value of *innovation and creativity*. As it stands, the automatic linkage between disruptive innovation and a certain piece

of technology has rarely been challenged in the literature, less so the esoteric definition of disruptive innovation, which often puts higher education on the back foot in dealing with this increasingly tangible force. Moving technology out of the frame, leaders of liberal arts colleges actually find themselves doing and advocating something quite disruptive or, in their own words, something that "they have never tried before."

So, what should we take "disruptive innovation" for? Is it a theoretical monolith named after Prof. Clayton Christensen and his colleagues? Is it another piece of advanced technology with which somebody else is going to do something? Is it an esoteric product of industry that reduces higher education leaders only to suspicion? Or Can it be a simplified list of actionable items that every higher education leader can and should master? The dialogues usefully break down this monolithic term into some meaningful and actionable parts. As a matter of fact, the things which people have been trying right now in the liberal arts sector fit into an adapted framework of disruptive innovation, one that focuses on the three principles, i.e., non-competition/new value, job-to-be-done/new need, and unbundling/new model, and breaks away when necessary with the mandate of technology which synergizes less well with the norms and practices of liberal arts education than elsewhere in higher education. The proposed 3+1 DI model, while not pronounced, was actually found in practice according to some interview participants and more distinctively in the three case studies. These practices fall to the domains including but not limited to new framework of general education component, strategic integration of summer semesters, specific practice areas including innovative laboratory, Curricular R&D, and innovative enrollment schemes. To illustrate how this flexible model could move toward a direction of practical and strategic use by liberal arts colleges, four guiding

questions are suggested below as a framework for deliberation in the processes of strategic planning and/or institutional assessment:

1. Non-Competition/New Value: What need is not fulfilled?
2. Job-To-Be-Done/New Need: What is it that nobody is doing in fulfilling it?
3. Unbundling/New Strategy: What strategy does it take for doing it? And
4. Optional Technology: What technology can complement the strategy in fulfilling it?

This framework distinguishes itself by shifting toward need from resource, and toward reality from institutional mission. In a way, it contradicts and complements at the same time the conventional wisdom of strategic planning by asking: what else can we do to build new competitive advantages while maintaining our positions in the old? Utilizing this framework places higher education leaders on an advantageous position by the ability to tap on the tremendous power of technology while knowing that this power is not absolutely necessary when it may cause more hindrances than benefits. By focusing on need and reality rather than resource and institutional mission, this framework also allows higher education institutions to study and adapt to trends in financial models, learning outcomes, and workforce development (Sutin and Jacob 2016) with a new faculty that helps catching up with industry and the general needs of the society. Thereby it is proposed that higher education institutions establish tangible and semi-autonomous center or institute for studying, modeling, and implementing useful disruptive innovations for constantly challenging, aligning, and advancing the institutional mission.

The 3+1 DI model, along with the four-question strategic framework, also allows higher education institutions to stand ahead of change while not making imprudent decisions at their own peril. As mentioned by one of the interviewees: Liberal arts colleges do not need disruptive

innovation to distinguish themselves from other higher education institutions if they are already so distinguished from them. The question is: To what extent are values and needs delivered from this distinctiveness? Does it help a liberal arts college emerge into prosperity and prominence? Or does it contribute only to a slump into financial insecurity and obscure purposes? To that, this model and framework offer a guided narrative of growth rather than survival of which the latter is so often associated with disruptive innovation. Disruptive innovation is not a panic button.

Finally, this model and framework are meant to extend the momentum for research on disruptive innovation, for which two directions look promising: On one hand, future research should continue building upon the understanding of the strategic position of the liberal arts sector in U.S. higher education, monitoring how a collective sense of being (albeit so different individually) continues to develop and contribute to the literature on disruptive innovation. On the other hand, the adoption of the liberal arts model around the world provides rich soil for comparative studies on how local models deliver context-related values and needs and how methods of disruptive innovation are implemented accordingly.

5.6 CONCLUSIONS

To conclude this study, it is safe to say that the trend delineated by Breneman (1990) and Baker and colleagues (2012) is still ongoing in 2017, that liberal arts colleges in the United States are in a process of transformation. What this study managed to build upon the legacy of the previous two studies is a lens of insiders as well as a substantial characterization of the U.S. liberal arts colleges other than they are “small colleges”. It also responded to the Baker and colleagues (2012)’s unanswered question most definitely, that *liberal arts colleges are indeed redefining*

themselves in the 21st century, but not without a growing awareness of a powerful change agent in disruptive innovation. It is with a hope that future studies continue on this path to inform this important sector of higher education not only in the U.S. but also in other parts of the world.

APPENDIX A

ONLINE SURVEY QUESTIONNAIRE

Analyzing Disruptive Innovation in U.S. Higher Education Institutions

Classic Clayton Christensen's disruptive innovation theory suggests that a disruptive innovation is a simpler and cheaper solution for customers that, by virtue of technological advancement and following the marketing principles of non-competition, job-to-be-done, and unbundling, emerges to challenge an existing solution that is more complex and expensive. Disruptive innovation is antithetical to sustaining innovation which brings about steady and incremental change. Massive Open Online Course (MOOC) is an example of disruptive innovation in higher education. This survey examines the context of U.S. liberal arts colleges in order to better understand DI's practical implication on the U.S. higher education sector.

1. I am _____ of my institution.

A. Chief Academic Officer or equivalent
B. Chief Information Officer or equivalent
C. Chief Financial Officer or equivalent

2. On a scale of 1 to 5 (1 = strongly disagree and 5 = strongly agree), how would you rate the following statements?

a. I am familiar with the concept of disruptive innovation.

b. I am in favor of disruptive innovation.

c. Disruptive innovation is relevant to independent liberal arts colleges in the United States.

d. Disruptive innovation can work in the context of independent liberal arts colleges in the United States.

e. Disruptive innovation is useful to institutional innovation of independent liberal arts colleges in the United States.

f. In the United States, independent liberal arts colleges serve particular needs that are not served by other higher education institutions, e.g., research universities, community colleges, etc.

g. The independent liberal arts college that I work for serves particular needs that are not served by other independent liberal arts colleges in the United States.

h. There are particular needs that are neglected by both independent liberal arts colleges and other higher education institutions in the Unites States.

i. Technology is increasingly important in advancing the mission of liberal arts colleges.

j. Liberal arts education can be successfully delivered by digitized experiences.

k. Service digitization can be strategically utilized to lower costs for liberal arts colleges.

3. I believe students/faculty members chose our institution mainly because of _____ (provide up to three reasons with 1 = highest significance and 3 = lowest significance).

Stakeholders	1	2	3
Students			
Faculty Members			

4. On a scale of 1 to 10 (where 1 = very low and 10 = very high), how would you rate the importance of each of the following items to a successful independent liberal arts college in the United States?

Items	1	2	3	4	5	6	7	8	9	10
A Prescribed Liberal Arts Core										
Graduate Programs										
Vocational Programs										
Small Enrollment										
Small Class										
Being Residential										
Online Programs										
Institutional Innovation										
Institutional Collaboration										
Disruptive Innovation										
Internationalization										
Community Development										
Interdisciplinary										
Service Digitization										
Educational Technology										
Other _____										

5. On a scale of 1 to 10 (where 1 = very low and 10 = very high), how would you rate your institution's commitment to each of the following items?

Items	1	2	3	4	5	6	7	8	9	10
A Prescribed Liberal Arts Core										
Graduate Programs										
Vocational Programs										
Small Enrollment										
Small Class										
Being Residential										
Online Programs										
Institutional Innovation										
Institutional Collaboration										
Disruptive Innovation										
Internationalization										
Community Development										
Interdisciplinary										
Service Digitization										
Educational Technology										
Other _____										

6. On a scale of 1 to 10 (where 1 = very low and 10 = very high), how would you rate each of the following items according to its contribution to your institution's mission?

Items	1	2	3	4	5	6	7	8	9	10
A Prescribed Liberal Arts Core										
Graduate Programs										
Vocational Programs										
Small Enrollment										
Small Class										
Being Residential										
Online Programs										
Institutional Innovation										
Institutional Collaboration										
Disruptive Innovation										
Internationalization										
Community Development										
Interdisciplinary										
Service Digitization										
Educational Technology										
Other _____										

7. Are you aware of an existing disruptive innovation example at your institution? If "Yes", please describe the example.

- ❍ Yes. _____
- ❍ No.

8. Are you willing to participate in a follow-up interview on the topic of disruptive innovation and U.S. liberal arts colleges?

- ❍ Yes.
- ❍ No.

9. What else would you like to share about disruptive innovation and U.S. liberal arts colleges not already covered in this survey?

APPENDIX B

CONTENT EXPERT INTERVIEW QUESTIONNAIRE

Analyzing Disruptive Innovation in U.S. Higher Education Institutions

Classic Clayton Christensen's disruptive innovation theory suggests that a *disruptive innovation* is a simpler and cheaper solution for customers that, by virtue of technological advancement and following the marketing principles of *non-competition*, *job-to-be-done*, and *unbundling*, emerges to challenge an existing solution that is more complex and expensive. Disruptive innovation is antithetical to *sustaining innovation* which brings about steady and incremental change. Massive Open Online Course (MOOC) is an example of disruptive innovation in higher education. This interview explores the context of U.S. liberal arts colleges in order to better understand DI's practical implication on the U.S. higher education sector.

General Questions about Disruptive Innovation

1. What are the strengths of contemporary independent liberal arts colleges in the U.S. higher education system?

2. What are the weaknesses of liberal arts colleges?

3. To what extent is disruptive innovation changing the status quo of independent liberal arts colleges in the United States?

4. What opportunities does disruptive innovation bring to independent liberal arts colleges in the United States?

5. What threats does disruptive innovation bring to independent liberal arts colleges in the United States?

6. What role does disruptive innovation play in institutional innovation of contemporary independent liberal arts colleges?

Institutional Questions about Disruptive Innovation

7. What institutional factors are the most important for the sustained success of your institution?

8. What institutional factors are becoming increasingly less important for the success of your institution?

9. What particular areas does your institution face increasing competition?

10. What areas does your institution face less to no competition?

11. What unique needs does your institution serve? How are these needs satisfied?

12. What role does technology, esp. service digitization, play in advancing the mission of your institution?

13. Please describe one disruptive innovation you are most familiar with at your institution.
    a. Indicate how it was initiated, supported, and what area it has influenced the most.
    b. How does it work with the unique strengths of your institution?
    c. To what extent has it influenced the overall change of your institution since its initiation?
    d. What role does technology, esp. service digitization, play in this disruptive innovation?

14. What else would you like to share about disruptive innovation not already covered in this interview?

APPENDIX C

COMPLETE CODING RESULTS OF ONLINE SURVEY QUESTION 3

Ranking	*Students*			*Faculty*		
	1	**2**	**3**	**1**	**2**	**3**
1	Quality (22)	Quality (17)	Location (15)	Reputation (15)	Location (13)	Close interaction (8)
2	Close interaction (15)	Close interaction (13)	Quality (13)	Teaching (15)	Small size (11)	Community (8)
3	Reputation (14)	Small size (10)	Small size (10)	Quality (14)	Reputation (9)	Location (8)
4	Small size (12)	Location (8)	Curriculum (9)	Liberal arts (9)	Student quality (8)	Reputation (8)
5	Community (8)	Personalized education (8)	Low cost (7)	Mission (9)	Community (7)	Quality (7)
6	Mission (6)	Reputation (8)	Personalized education (6)	Balance (7)	Liberal arts (6)	Small size (7)
7	Liberal arts (5)	Community (6)	Socialization (5)	Community (6)	Quality (6)	Amenities (5)
8	Low cost (5)	Curriculum (5)	Amenities (4)	Career (5)	Teaching (6)	Compensation (5)
9	Personalized Education (5)	Low cost (5)	Career (4)	Close interaction (5)	Balance (4)	Research (5)
10	Religious Affiliation (4)	Religious affiliation (5)	Community (4)	Small Size (5)	Close interaction (4)	Liberal arts (4)
11	Location (4)	Research (4)	Close interaction (3)	Academic freedom (4)	Compensation (4)	Mission (4)
12	Curriculum (4)	Athletics (3)	Physicality (3)	Student quality (4)	Culture (4)	Academic freedom (3)
13	Career (2)	Internationalization (2)	Reputation (3)	Location (3)	Research (4)	Faculty development (3)
14	Amenities (1)	Outcome (2)	Liberal arts (2)	Culture (2)	Curriculum (3)	Student quality (3)
15	Support (1)	Residential experience (2)	Research (2)	Curriculum (2)	Career (2)	Support (3)
16	Relevancy (1)	Liberal arts (1)	Athletics (1)	Religious affiliation (2)	Internationalization (2)	Undergraduate education (3)
17	Other (6)	Mission (1)	Governance (1)	Undergraduate education (1)	Resource (2)	Balance (2)
18		Ranking (1)	Internationalization (1)	Diversity (1)	Diversity (1)	Culture (1)
19		Support (1)	Mission (1)	Research (1)	Interdisciplinarity (1)	Financial strength (1)
20		Technology (1)	Outcome (1)	Resource (1)	Mission (1)	Interdisciplinarit

						y (1)
21		Tradition (1)	Ranking (1)	Other (4)	Personalized education (1)	Personalized education (1)
22		Other (9)	Residential experience (1)		Faculty development (1)	Teaching (1)
23			Other (17)		Relevancy (1)	Other (16)
24					Religious affiliation (1)	
25					Undergraduate education (1)	
26					Physicality (1)	
27					Other (9)	

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