

Grade – 99/100

+10 for turning in early

109/100 final grade

**Question:** Is the integration of technology in our food the correct choice for the 21<sup>st</sup> century?

**Thesis:** The integration of technology in our food is not the correct choice for the 21<sup>st</sup> century as it is unsafe for the consumer and causes unintended changes on the environment.

**Concession:** Yet in contrast, one may see the integration of technology in our food as the correct choice for the 21<sup>st</sup> century as it serves as a problem solver to various food concerns and proves to have substantial economic benefits.

**Unsafe for consumer:**

**Example:** “Regular use of the technology in food processing started in 1963 when the U.S. Food and Drug Administration (FDA) approved the sale of irradiated wheat and wheat flour. Today irradiation treatment is used on a wide variety of food products and is regulated in the United States by the FDA under a Department of Health and Human Services regulation. The U.S. Centers for Disease Control (CDC) estimate that seventy-six million Americans get sick, and five thousand die each year from illnesses caused by foodborne microorganisms, such as E. coli, Salmonella, the botulism toxin, and other pathogens responsible for food poisoning” (Ford-Martin, 2016).

**Analysis:** With ailments, illness, and death as direct results from the cause of technology changing our food, it is with logical reasoning to end this recent development of food preservation. The integration of technology should not extent be killing the very people it’s supposed to feed. With the FDA approving this method, it’s an appropriate fear to have of the naïve corporation regulating this, regulating us and our lives as they are killing us with our food.

**Validation:** This comes from a source that deals with patients who have suffered from the consequences of GMO’s and this company aims to eliminate the food irradiation process through bringing awareness to those who have suffered. It is a small organization however, discussing the global issue of the impacts and the ethics that have been violated, they remain quite unknown as they have not been around long enough to gain the footing some organizations have to fight.

**Example:** “The US Food and Drug Administration does not require labelling of GM foods per se, but only if the transgenic food is substantially different from its conventional counterpart. The EU, by contrast, requires labelling of all foodstuffs, additives and flavors containing 1 % or more genetically modified material” (Buiatti, 2013).

**Analysis:** This demonstrates that most consumers remain unaware of what is going into their food which breaks a degree of ethics as the EU is one of few that has demonstrated their superiority by informing their customers of what they are consuming and this shows that not all regions care enough to require this sort of labelling. If the modified foods are safe, then companies should not have any issue providing these labels. Chemicals, additives, or genetically modified material remain hidden in most regions which demonstrates the danger brought by the integration of technology in our food.

**Validation:** Buiatti, from a full-text archive of biomedical and life sciences that provides a repository for researchers across the globe to upload their research journals. The archive requires all journals to be in compliance with policies of participating research funding agencies however, PMC is not a publisher and does not publish journal articles itself.

**Environmental changes:**

**Example:** “Unintended effects on the dynamics of populations in the receiving environment as a result of impacts on non-target species, which may occur directly by predation or competition, or indirectly by changes in land use or farming practices; unintended effects on biogeochemistry, especially through impacts on soil microbial populations that regulate the flow of nitrogen, phosphorus and other essential elements; the transfer of inserted genetic material to other domesticated or native populations, generally known as gene flow, through pollination, mixed matings, dispersal or microbial transfer” (Diouf, 2001).

**Analysis:** With unintended effects on non-targeted species, this demonstrates the lack of control and the lack of full understanding we have of the impacts technology may have. This naïve thinking can lead to the demise of multiple species and alter the course of nature proving the dangers of technology in our food.

**Validation:** The FAO; An intergovernmental organization, FAO has 194 Member Nations, present in over 130 countries, their aim is to eradicate world hunger and food insecurities through the elimination of poverty. This ideal however, may be based on a democratic economic structure to end poverty.

**Example:** “As already discussed by Ch. Darwin in his treatise on worms, plants are connected through reciprocal exchange of nutritional components with the microbial flora and fauna, both liable to be affected by all agricultural practices from the use of chemicals, soil management, water distribution, etc. For this reason, the impact of GMOs will not only derive from the plant itself but also from its exudates and the agricultural practices to which single genetically modified plants (GMPs) are connected” (Buiatti, 2013).

**Analysis:** With the impacts of GMO's not only affecting the single genetically modified plant, but affecting and changing nutritional components of agricultural practices, this demonstrates the dangers and the lack of control we have over this sort of manipulation. Nature is not something we can change on a whim, and if we are to preserve our earth for many generations to come, we must not endanger the species it inhabits.

**Validation:** Buiatti, from a full-text archive of biomedical and life sciences that provides a repository for researchers across the globe to upload their research journals. The archive requires all journals to be in compliance with policies of participating research funding agencies and PMC is not a publisher and does not publish journal articles itself.

**Problem Solver:**

**Example:** “He stressed that presently there is hunger and poverty which has now become a global problem, but said that the technology available in tackling the menace has come under serious attacks

based on the misconception, thus the need to engage the media to spread the right information about GMOs. Mr. HamzatLawal lamented that over 53 million Nigerians go to bed with empty stomach, describing the situation as worrisome because it has exacerbated corruption cases in the country, adding that the advent of technology and science could help in curbing this menace" (Unsafe GMOs Barred From Nigerian Market, 2016).

**Analysis:** The world hunger crisis is most prominent in regions of Africa and may be aided with the integration of technology in our food. Having ways to mass produce foods, and provide them to all could allow for food to be a resource available to all and help aid the fight against world hunger. It may not fix world hunger per se, but it could be a step in the right direction and help put our era in a more innovative mindset to finding more creative solutions to our global issues.

**Validation:** allAfrica is a news organization based in Africa that provides articles of issues of hot debate. They have included a vast range of articles that have some sort of impact on the social construct of Africa. Issues like hunger make their headlines often as that is a hotly debated issue of which has many effects on Africa and the countries that assist in minimizing this issue.

**Example:** "While traditional biotechnology improves the quality and yields of plants and animals through, for example, selective breeding, genetic engineering<sup>1</sup> is a new biotechnology that enables direct manipulation of genetic material (inserting, removing or altering genes). In this way the new technology speeds up the development process, shaving years off R&D programs. To date genetic engineering in agriculture has mainly been used to modify crops so that they have improved agronomic traits such as tolerance of specific chemical herbicides and resistance to pests and diseases" (Nielsen & Anderson, 2000).

**Analysis:** Time is one of the biggest factors when it comes to food production; cutting time, growing more, using less land; these are all ways that help put us in a more progressive era and improve the quality of the food supply. Natural food production is slow and could have diseases, but genetic engineering has the potential to curb these issues and modify crops to improve the agribusiness. The integration of technology in our food will help provide us with more for less.

**Validation:** Nielson: University of Copenhagen, and Danish Institute of Agricultural and Fisheries Economics (SJFI) in Denmark. Anderson: CEPR, and School of Economics and Centre for International Economic Studies University of Adelaide in Australia. These authors are from regions that put production and innovation before the natural order of food. Food is seen as a commodity in these countries and not as a natural right to its citizens.

### **Economic Benefits:**

**Example:** "Rice and cotton would each contribute to Chinese economic welfare more than \$1 billion per year, and maize and soybean combined would add an additional \$0.8 billion, assuming the technology boosts total factor productivity by 5 per cent. To these gross benefits need to be subtracted the cost of the R&D necessary to develop and disseminate the new technology, and the cost of any negative environmental externalities associated with the release of these GM products into the rural environment." (Anderson & Yao, 2001)

**Analysis:** The economic state of China would help countries across the globe as their product would be mass produced and sold for cheaper which would allow for more product to be in circulation and allow

China to gain economically from this technology. International trade would be more prominent and foreign relations may improve allowing for a more solid base for international affairs to take place. The integration of technology in our food may inspire new grounds for countries to work together to progress our era as a whole toward a new and enlightened future.

**Validation:** Anderson: CEPR, and School of Economics and Centre for International Economic Studies University of Adelaide in Australia. Yao: Department of Economics and Finance, Faculty of Business City University of Hong Kong, Kowloon, Hong Kong. Both authors come from regions that have a primary aim to improve the economic health of their countries which may be a goal that comes before the safety of their food. With nations hoping to be self-sufficient through regulation of large-scale industries, it lowers the quality of production as the price of economic growth.

**Example:** "Development of plants with enhanced agronomic traits aims at increasing farmer profitability, typically by reducing input requirements and hence costs, i.e. an increase in factor productivity. Genetic modification can also be used to improve the final quality. Such traits may include enhanced nutritional content, improved durability and better processing characteristics. This type of crop will typically sell at a higher market price since it is a different, better-quality product for which the buyer would be willing to pay a higher price. Most of these types of modification are still in the research pipeline. The United States holds almost three-fourths of the total crop area devoted to genetically modified crops (Table 3). Other major GM-producers are Argentina, Canada and China. At the national level, the largest shares of genetically engineered crops in the total in 1999 were found in Argentina (approximately 90% of the soybean crop), Canada (62% of the rapeseed crop) and the United States (55% of cotton, 50% of soybean and 33% of maize)" (James 1999).

**Analysis:** With countries across the globe taking part in the production of GMO's, it's only fitting that countries follow suit to be able to keep up with the economic state of international trade. GMO's cut time needed to produce, and produce more on less land. These factors help push supply which in turn assists the economic health of countries and will further the distribution of food across the globe. Jobs may open up as the agribusiness becomes more secure for developing countries and more sufficient for developed countries allowing for focus to be placed on other areas of work and progression.

**Validation:** James has written extensively upon the global status of commercialized transgenic crops dating back to the 90's and works with the organization who aims to serve and assist the 800 million people who live in hunger due to poverty. The organization is free however, which explains their justification for advocating the integration of GMO's as their primary aim is to help feed people, possibly without understanding all factors that go with that.

### **Reflection:**

Prior to my research, I was unaware of the global impact of the integration of technology in our food. I had never really looked at the possible benefits as I reside with the natural process of food production and agriculture. I now understand that there are possible benefits that can change the agribusiness and provide more for less through a new innovative method of food production. The changes to the agribusiness help provide our era with a new innovative perspective to find creative solutions to our problems and influence the economic health through this process. Now fully understanding both the

impacts and the dangers, I will have a more open outlook on the issue as I understand that residing with the natural process is not the only correct answer for the 21<sup>st</sup> century. I hope to see more research being conducted on the environmental effects of GMO's and to see a healthy balance between innovation of the agribusiness and the environmental health of our world.

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